ANTHROPOLOGIE • XLVI/1 • pp. 77–101 • 2008

IVANA JAROŠOVÁ, MARTA DOČKALOVÁ

DENTAL REMAINS FROM THE NEOLITHIC SETTLEMENTS IN MORAVIA, CZECH REPUBLIC

ABSTRACT: The examined skeletal series was recovered from various Moravian Neolithic settlements. The sample is comprised of 55 (52.9%) subadults (0–19-year-old), 14 (13.5%) adult males, 25 (24.1%) adult females, and of 10 (9.6%) adults of undetermined sex. From the archaeological point of view, there are three periods of Neolithic cultures based on different ornaments on ceramics, thus the sample of 104 examined individuals with present dentitions was divided subsequently according to this criterion as well: 73 individuals belonged to the Linear Pottery Culture (LBK 5700–4900 BC), 10 to the Stroked Pottery Culture (STK 4900–4700 BC), and 21 to the Lengyel culture, well known in Moravia as Moravian Painted Pottery Culture (LgK 4700–4000 BC). In this study all these individuals were scored for dental caries, dental wear, and the prevalence of dental enamel hypoplasia (DEH). Dental caries and dental wear were scored in order to find out basic characteristics of consumed food, and DEH was scored in order to find out the extent of non-specific stressors (i.e. indicators of metabolic and nutritional disruptions) within the Neolithic period.

In the examined Neolithic sample there was only one case of dental caries detected in subadult (0–19 yrs) individuals. In comparison to the later Neolithic periods, the highest values of caries intensity (13.3) and frequency (42.9) were found in the LBK. In this oldest period of Moravian Neolithic the highest values of dental wear were found out as well. It is highly probable that the composition of food in individuals during the Linear Pottery Culture period was slightly richer in carbohydrates and contained a higher number of abrasive particles in comparison to the later Neolithic periods (i.e. STK and LgK).

Manipulative incisor wear was found in 14 of 104 analysed specimens, predominantly in females of LBK. This wear occurs probably in relationship with activities involving the processing of fibrous materials, most likely sinews.

Dental enamel hypoplasia was present in low frequency (14.5%). Among the three periods, the highest frequency of enamel hypoplastic lesions was found out within individuals of the Lengyel culture (18.8%), whereas individuals of the LBK displayed lower values (13.5%), and individuals of the STK period even the lowest rate (12.5%) of DEH. Individuals from various settlements showed a similar ability to cope with later insults of non-specific stressors during the Neolithic period, i.e. 5700–4000 BC.

KEY WORDS: Teeth – Neolithic settlements – Moravia – Linear Pottery Culture – Stroked Pottery Culture – Lengyel Culture – Dental Caries – Pre-mortem tooth loss – Occlusal wear – Manipulative wear – Dental Enamel Hypoplasia

INTRODUCTION

The Early Neolithic period is characterized by the transition from hunter-gatherers to the earliest agro/pastoral populations. It is a time of developing grain cultivation, domestication and breeding of cattle, spread of agriculture from the original centres, manufacture of pottery and tools, beginning of textile production and last but not least a period of colonisation waves and foundation of settlements. The Neolithic period in Moravia has been approximately dated back to 5700–4000 BC. During this time span three main archaeological cultures occupied this territory, gradually changing for one another. Their names are based on typical ways of decorating pottery. In the Early Neolithic it was the

FIGURE 1. Neolithic sites in Moravia, Czech Republic.

Linear Pottery culture (LBK, 5700–4900 BC), followed by the Stroked Pottery culture (STK, 4900–4700 BC), and in the Late Neolithic the Moravian Painted Pottery culture, which is the Moravian branch of the Lengyel culture (LgK, 4700–4000 BC, or 3800 BC), the younger phase of which already belongs to the Eneolithic period (Mateiciucová 2008, Podborský *et al.* 1993).

The largest graveyard at all from the oldest Neolithic phase in the Czech Republic was excavated at Vedrovice from 1975 to 1984 (Podborský *et al.* 2002). One discovered here altogether 87 skeletal remains of individuals from the graveyard "Široká u lesa" (53rd century BC), another 12 individuals from the relevant settlement "Široká u lesa", and aside from these still 13 individuals from the location Vedrovice – "Za dvorem". Thus, 112 individuals in total were found at Vedrovice, from among which only a single one could be dated back to the LgK period, the remaining 111 pertain to the LBK population. Detailed anthropological studies of the burial ground at Vedrovice "Široká u lesa" had been conducted in 2005–2007 by the University of Sheffield and the Moravian Museum Brno (see Anthropologie 2–3/2008). Another Neolithic LBK graveyard at Krškany, excavated in mid-1960s (see Pavúk 1972), is located near Nitra in Slovakia and includes 68 individuals. A detailed anthropological study of this series had not been conducted yet, although an investigation of dental remains was already completed (Frayer 2004) and used as a comparative sample for individuals from the burial ground at Vedrovice "Široká u lesa", and in this paper as well. Detailed anthropological studies of the series from Neolithic settlements had not been carried out up to now, therefore this investigation should fill in the missing information concerning the inhabitants of Central and South Moravia compared to another samples from Central Europe.

In this paper we focused on the main dental aspects of the Neolithic population from 35 settlements in Moravia. The aim was to capture the changes inscribed into the dentitions of the then inhabitants, with the aim of which one can partly reconstruct the living conditions of that time. In other words, by help of three main characteristics of dentitions, i.e. caries, dental wear and enamel hypoplasia, to reconstruct the aspects of consumed food, focus on the health state of individuals and compare these data with chronologically and geographically analogous series.

Dental caries (*caries dentis*) can be defined in terms of etiopatogenesis as a microbial disease of calcificated dental tissues characterised by the demineralisation of inorganic and destruction of organic components of dental tissues (Crawford 2002). An advanced caries can lead to loss in vitality of dental pulp and finally to a tooth loss, or eventually to another pathological processes (Kilian *et al.* 1999). The emergence of caries depends on the susceptibility of dental tissues (constitutional and genetic factors, sex, age), the composition of oral microflora (dental plaque microorganisms are cariogenic), nutrition factors and time, i.e. the frequency and duration of interaction, which is, too, closely related with oral hygiene (Wotke 2001, Kilian *et al.* 1999). The dependence of dental cariosity on the composition of food in historical populations was treated

by many authors (e.g. Lillie 1996, Saunders *et al.* 1997, Lingström, Borrman 1999). Palaeolithic and Mesolithic populations show the lowest caries rate; in Neolithic populations that began to settle down and change over to an agricultural way of life, cariosity became gradually increased. This was connected with a transition to another type of food, which in the course of centuries, in contrast to preceding periods, contained more sugar, was also more prepared and relieved of undesirable ingredients whereby the roughage content in food became gradually reduced.

Dental wear is the loss of dental surface caused by external mechanical forces, above all in connection with food. The degree of dental wear depends not only on the coarseness of particles, but also on the condition of dental surfaces, because particles stick easier to a roughened surface than to a smooth one (Mair *et al.* 1996, Mair 1999). Further there is also a *peculiar wear*, which is concentrated to one single tooth or a group of teeth. This type of wear is mostly caused by objects coming in contact with teeth, and these processes we designate cumulatively as professional influences.

The study of health state and of the overall population fitness is also an object of interest to skeletal biologist. The deterioration of environmental factors results in a disturbed physiological balance not only in individuals but also in the population overall. Once the resistance threshold in persons exposed to a non-specific stress is exceeded, a disturbance of physiological balance occurs, which can cause a proper cascade of changes. This turnover leads to the emergence of non-specific stress markers (*Harris lines*, *dental enamel hypoplasia*, *cribra orbitalia* a. o.), which are consequently observable on skeletal remains. The impact of stress on the population is reflected not only in a decreased fitness and physical efficiency (reduced work effort), but also in a diminished reproductive capacity (increased abortion rate and reduced viability of newborns). All these factors are reflected in a disturbed socio-economical balance of the entire population (Goodman/Armelagos 1989, Larsen 1997). Dental enamel hypoplasia examined in individuals thus offers valuable information on health state and overall population fitness, trying to make a retrospective reconstruction of its behaviour and adaptation to the environment occupied.

MATERIAL

Archaeological finds of isolated burials at settlements are relatively frequent in Moravia, Czech Republic (Čižmář, Dočkalová 2004, Čižmář 2000, 2004, 2006, Čižmář, Geislerová 1997, 2006, Čižmář, Přichystal 2006, Dočkalová, Košťuřík 1996, Humpola 2007, Hájek 2007, Kazdová 1992, Kazdová, Lorencová 1985, Oliva 2005, Ondruš 1972, 1976, Podborský 1969, 1973–4, 1975–6, 1988, Podborský *et al.* 2002, Přichystal 2006, 2008, Šmíd 2003, 2004, 2006, Trampota 2008, etc.; *Figure 1*). Partial studies concerning the evaluation of demographic distribution, metrical characteristics and some dental aspects of this archaeological assemblage from the Neolithic period were already published (Dočkalová 2005, 2006, Dočkalová, Čižmář 2007, 2009, Fojtová *et al.* 2008, Jarošová *et al.* 2008), but a comprehensive anthropological evaluation was undertaken. This study represents the state of the problem treated whereby at the end of 2008 the anthropological analysis of Moravian Neolithic settlements was dealing with skeletal remains of total 122 individuals (*Table 1*), 82 of them pertaining to LBK, 13 to STK and 27 to the LgK periods. 49 of the total number of 62 children and subadults were found at LBK, only 2 at STK and 11 at LgK settlements. For the adult population, there were more females than males buried at Moravian Neolithic settlements, although a certain shift in this interpretation can be caused by the additional determination of undetermined adult individuals, the skeletal remains of which still offer a certain reserve of shift for future using of the ancient DNA methods.

TABLE 1. Examined individuals from Moravian settlements according to estimated sex.

	Subadults (0–19 yrs)			Adults (20+ yrs)			All
	child	child (F?)	child (M?)	F	M	?	
LBK	41	4	4	16	9	8	82
STK	2			3	3	5	13
LgK	9	2		9	4	3	27
all	52	6	4	28	16	16	122

In 104 (85.2 %) from the total number of 122 individuals one could study the dentition or jaws. The evaluation of dentition state was thus possible in 55 subadults and 49 adults (*Table 2, Appendix 1*) who are further subdivided by cultures (LBK, STK, LgK). The individuals from remaining burials had to be excluded from the analysis due to their jaws with teeth found in a poor condition, because the skeletal parts mentioned were either completely absent or preserved only fragmentarily.

METHODS

The analysed occurrence of caries and hypoplasia included both the individuals with deciduous teeth and those with permanent teeth. The analysis of dental wears comprised adult individuals aged over 20 with permanent dentition. In the individuals from Neolithic settlements to be selected, the presence of at least one intact tooth of whatever type was demanded both in maxillae and in mandibles, no matter if on the right or left side.

State of preservation of teeth

State of preservation of teeth and jaws was assessed using two indices – the comparative alveolar index (CAI) and the comparative dental index (CDI). CAI is characterized as a relation between the number of preserved alveoli and the number of all burials multiplied by 32 [CAI=A/(n×32)],

TABLE 2. Total number of examined individuals from Neolithic settlements suited for investigation of dental remains. Age categories from Buikstra, Ubelaker (1994).

Sex	Age	LBK	STK	LgK	All
D	0–6 yrs	27		4	31
D	7–14 yrs	11	1	1	13
F	15–19 yrs	2		1	3
F?	15–19 yrs	1			1
M	15–19 yrs	3			3
N	15–19 yrs	1	1	2	4
total of subadults		45	2	8	55
F	20–35 yrs	8	1	4	13
	35–50 yrs	1	1	2	4
	50+ yrs	6	1	1	8
total of females		15	3	7	25
M	20–35 yrs	3	1	4	8
	35–50 yrs	2	1		3
	50+ yrs	2			2
total of males		7	2	4	13
M?	35–50 yrs	1			1
total of males?		1			1
?	20–35 yrs	3	2	1	6
	35–50 yrs	2	1	1	4
total of unsexed adults		5	3	2	10
total of all		73	10	21	104

and CDI is described as a relation between the number of preserved erupted teeth, the number of teeth lost intravitam (i.e. ante-mortem) and the number of all burials multiplied by 32 [CDI=(Z+E)/(n×32)] (Hanáková, Stloukal 1966).

Dental caries

The presence or absence of caries (C) had been evaluated macroscopically.

Upon the recommendation of Buikstra and Ubelaker (1994), the type of caries had been evaluated macroscopically in both deciduous and permanent teeth, according to the numerical codes adapted by Moore and Corbett (1971): 1 = occlusal surface caries; 2 = smooth surface caries – interproximal surfaces (mesial and distal); 3 = smooth surface caries (buccal/labial and lingual/vestibular surfaces); 4 = cervical caries – interproximal surfaces (mesial and distal); 5 = cervical caries (except interproximal surfaces); 6 = root caries (below CEJ).

During the assessment of dental cariosity one should consider particular age categories, since the cariosity increases with age. In this regard the category infans (0–14 yrs) with deciduous and mixed dentition was separated from juvenile and adult individuals with permanent teeth, and in the final evaluation these groups were treated separately. The category of adults was further divided into three subcategories: 20–35 yrs, 35–50 yrs and over 50 yrs. This processing involved the data concerning healthy teeth (T), carious teeth (C), teeth lost intravitam (i.e. pre-mortem) (E) and post-mortem (P). If a pre-mortem tooth loss occurred (E), such teeth were evaluated as carious (C), even in a case that this loss possibly occurred for another, yet undetectable reasons [loss caused by strong wear, abscess, periodontal disease or trauma (Andrik, Müncnerová 1961)]. The teeth lost post-mortem (P) weren't included into the general evaluation of caries intensity and frequency. This general evaluation had been performed after the method developed by Stloukal (Stloukal 1963, *Table 3*). The abbreviations

TABLE 3. Caries frequency (F-CE) and caries intensity (I-CE) recording (adapted after Stloukal 1963).

Teeth	**Z**	number of preserved teeth	T + C (number of healthy teeth and carious teeth)	
	A	number of preserved dental alveoli	Z+P+E+retention (number of preserved teeth, teeth lost post mortem and intravitally, and retention of teeth)	
	E	number of teeth lost pre-mortem	%E – the percentage of pre-mortem losses	
	C	number of carious teeth	%C – caries incidence (the percentage of decayed teeth from the total number of preserved teeth)	
	I-CE	caries intensity – the total percentage of decayed teeth and the percentage of pre-mortem losses	I-CE=%C+%E	%C=C/Z %E=E/A
Individuals	**n**	number of examined individuals		
	nC	individuals with at least one caries	% nC – the total percentage of individuals with at least one caries	
	nE	individuals with at least one pre-mortem loss	% nE – the total percentage of individuals with at least one pre-mortem loss	
	nCE	individuals with both caries and pre-mortem losses	% nCE – the total percentage of individuals with both caries and pre-mortem losses	
	F-CE	caries frequency – the total percentage of individuals with at least one caries, at least one pre-mortem loss, or both caries and pre-mortem losses	F-CE=%nC+%nE+%nCE	%nC=nC/n %nE=nE/n %nCE=nCE/n

used (Z, A, E, C, %C, n, nC, %nC, nE, %nE, nCE, %nCE, I-CE, F-CE) were adopted from the method elaborated by Stloukal (1963), as well.

Occlusal wear

The attrition rates for incisors, canines and premolars were recorded along an eight-point scale based on the amount of exposed dentine (Smith 1984). Since the Smith system shows only a poor discrimination ability when the attrition rates are moderate to low, Buikstra and Ubelaker (1994) prefer the standards developed by Scott (1979) for molars. In the Scott system, each molar occlusal surface is divided into quadrants, and the amount of observable enamel is scored on a scale from 4 to 40. If any quadrant was not observable, such a tooth was not recorded.

Dental enamel hypoplasia

Dental enamel hypoplasia (DEH) can be defined, with regard to its emergence, as an evolutionary defect of hard dental tissues reflecting the non-specific stress indicators in recent, historical and palaeoanthropological populations, and offering a unique record of stress suffered in the childhood, which can be subsequently observed also on the dentition of adult individuals. These enamel defects can be interpreted as displays of nutritional deficiencies and infectious diseases (El-Najjar *et al.* 1978, Goodman 1998, Hodges, Wilkinson 1990, Lukacs 1992, Goodman 1993, Malville 1997, Wright 1997).

Selection of tooth types. DEH had been examined on three tooth types (I1, I2, C). This selection proceeded above all on the consideration of Goodman and Armelagos (1985) who had quoted that from the morphogenetical point of view, mainly the upper central incisors and mandibular canines are most sensitive to forming of hypoplasia.

Type of hypoplasia. 1. Teeth with the wear degree higher than 1/3 of the overall crown height, teeth with the presence of tartar and teeth with post-mortal enamel defects were excluded from the analysis. 2. Afterwards the presence or absence of dental enamel hypoplasia had been macroscopically examined on the labial surface of each tooth. 3. In case that the dental enamel hypoplasia was detected, the type of hypoplastic defect was determined according to the DDE index: lines (FDI type 4: L-lines, G-grooves), pits (FDI type 3: Ps-pits, Pl-pit line), and chronic enamel hypoplasia (i.e. "pit patches" and "continuous chronic enamel hypoplasia") (Santos, Coimbra 1999, Goodman *et al.* 1992, Goodman, Rose 1990, Ensor/Irish 1995, Sarnat/Schour 1941, Corruccini *et al.* 1985, Littleton 2005, Obertová 2005, Jarošová 2007, etc.). Lines and pits are classified in this paper as acute DEH (A DEH).

RESULTS

State of preservation of teeth and jaws

The state of preservation of alveoli and teeth in individuals from Neolithic populations was characterised by the comparative alveolar index CAI and comparative dental index CDI. In all Neolithic series more than a half of teeth (60.4%) and nearly 3/4 of alveoli (70.5%) available for further analyses (*Table 4*).

TABLE 4. Comparative alveolar and dental indices in populations from Neolithic settlements.

		n	CDI	CAI
LBK	M	8.0	52.7	60.9
	F	15.0	71.9	84.2
	M+F+?	28.0	57.7	68.2
STK	M	2.0	84.4	96.9
	F	3.0	87.5	100.0
	M+F+?	8.0	66.4	75.4
LgK	M	4.0	77.3	85.2
	F	7.0	66.1	75.9
	M+F+?	13.0	62.5	72.6
all		49.0	60.4	70.5

Carious teeth

The occurrence of caries was analysed in 55 subadult and 49 adult individuals with 1976 teeth from Neolithic settlements in Moravia. The evaluation of cariosity could be thus performed in 104 individuals (*Table 1*), representing approximately 85% of 122 available individuals, whereby altogether 1540 permanent teeth (349 in subadult individuals until 15 yrs, 294 in juvenile individuals and 897 in adults), and 436 deciduous teeth were examined. During this epidemiological study based on direct inspection being performed two times after six months, all teeth of deciduous and permanent dentition had been examined, both maxillar and mandibular. General evaluation of the occurrence of caries in the dentition of adults included the testing of two mutually independent criteria, i.e. sex and age (i.e. subadults versus adults), and it was carried out basing on the analytic scheme as follows: 1. caries intensity (I-CE), 2. caries frequency (F-CE) and 3. type of dental caries.

Caries intensity (I-CE)

79 of total 1106 preserved alveoli (A) were detected as intravital losses, in all cultural periods examined. 27 of total 868 permanent teeth were carious. The final I-CE is herewith 10.2. The highest caries rate (%C) and ratio of ante-mortem losses (%E) could be detected in individuals of LBK. Thus, it can be stated that the I-CE of the oldest Neolithic phase (LBK) showed the highest value of 13.3 (%C=4.1; %E=9.2). The second highest values of I-CE could be recorded in individuals from the LgK sphere (%C=2.5; %E=7.3), while the healthiest teeth were detected in individuals of STK where the sum of caries rate and the ratio of ante-mortem losses only reached 1.7% (%C=1.2; %E=0.5) (*Table 6*) [note: increased values of I-CE in individuals of LBK are given to a certain degree also by the high cariosity in a male from Vedrovice (burial 10/74)

TABLE 5. Caries intensity in adults (20+ yrs) of analysed groups from Neolithic settlements according to tooth types.

		Maxilla																
		Right								Left								
		M3	M2	M1	P2	P1	C	I2	I1	I1	I2	C	P1	P2	M1	M2	M3	Total
	C/Z	2/12	2/12	1/13	1/15	0/14	0/14	0/11	0/11	0/15	0/14	3/19	2/22	1/21	0/20	2/15	0/9	14/237
	%C	16.7	16.7	7.7	6.7	0.0	0.0	0.0	0.0	0.0	0.0	15.8	9.1	4.8	0.0	13.3	0.0	5.9
LBK	E/A	1/13	2/15	1/15	2/19	2/17	1/20	1/18	1/19	1/20	2/21	1/23	1/25	1/24	1/23	2/19	1/11	21/302
	%E	7.7	13.3	6.7	10.5	11.8	5.0	5.6	5.3	5.0	9.5	4.3	4.0	4.2	4.3	10.5	9.1	7.0
	I-CE	24.4	30.0	14.4	17.2	11.8	5.0	5.6	5.3	5.0	9.5	20.1	13.1	8.9	4.3	23.9	9.1	12.9
	C/Z	0/4	0/4	0/6	0/6	0/6	0/6	0/5	0/4	0/5	0/4	0/5	0/5	0/5	0/5	0/5	0/1	0/76
	%C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
STK	E/A	0/5	0/5	0/6	0/6	0/6	0/6	0/6	0/6	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/86
	%E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	I-CE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	C/Z	0/5	0/5	2/7	0/9	0/9	0/9	0/8	0/8	0/9	0/8	0/8	0/9	0/9	1/9	1/8	0/4	4/124
	%C	0.0	0.0	28.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.1	12.5	0.0	3.2
LgK	E/A	0/6	1/9	1/10	0/10	1/10	0/9	0/9	0/10	1/10	0/10	1/10	0/10	1/10	0/9	0/9	0/7	6/148
	%E	0.0	11.1	10.0	0.0	10.0	0.0	0.0	0.0	10.0	0.0	10.0	0.0	10.0	0.0	0.0	0.0	4.1
	I-CE	0.0	11.1	38.6	0.0	10.0	0.0	0.0	0.0	10.0	0.0	10.0	0.0	10.0	11.1	12.5	0.0	7.3

		Mandible																
		Right								Left								
		M3	M2	M1	P2	P1	C	I2	I1	I1	I2	C	P1	P2	M1	M2	M3	Total
	C/Z	0/10	2/11	0/16	0/17	1/15	0/15	0/14	0/13	0/13	0/14	0/15	0/16	1/19	1/15	0/12	0/9	5/224
	%C	0.0	18.2	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	6.7	0.0	0.0	2.2
LBK	E/A	3/13	3/19	2/19	1/20	1/20	1/21	2/20	2/21	2/21	1/20	1/19	2/21	2/22	4/20	6/20	2/13	35/309
	%E	23.1	15.8	10.5	5.0	5.0	4.8	10.0	9.5	9.5	5.0	5.3	9.5	9.1	20.0	30.0	15.4	11.3
	I-CE	23.1	34.0	10.5	5.0	11.7	4.8	10.0	9.5	9.5	5.0	5.3	9.5	14.4	26.7	30.0	15.4	13.6
	C/Z	0/6	1/4	1/6	0/7	0/6	0/6	0/6	0/5	0/4	0/6	0/6	0/6	0/7	0/7	0/5	0/6	2/93
	%C	0.0	25.0	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2
STK	E/A	0/6	0/7	1/7	0/7	0/7	0/7	0/7	0/7	0/6	0/6	0/6	0/7	0/7	0/7	0/7	0/6	1/107
	%E	0.0	0.0	14.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
	I-CE	0.0	25.0	31.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1
	C/Z	0/7	1/5	0/8	0/8	0/8	0/6	0/6	0/5	0/6	0/7	0/9	0/7	0/9	0/9	1/7	0/7	2/114
	%C	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.3	0.0	1.8
LgK	E/A	1/9	1/9	1/9	1/9	1/9	1/10	1/10	1/10	1/10	1/10	1/11	1/10	1/11	1/10	1/9	1/8	16/154
	%E	11.1	11.1	11.1	11.1	11.1	10.0	10.0	10.0	10.0	10.0	9.1	10.0	9.1	10.0	11.1	12.5	10.4
	I-CE	11.1	31.1	11.1	11.1	11.1	10.0	10.0	10.0	10.0	10.0	9.1	10.0	9.1	10.0	25.4	12.5	12.1

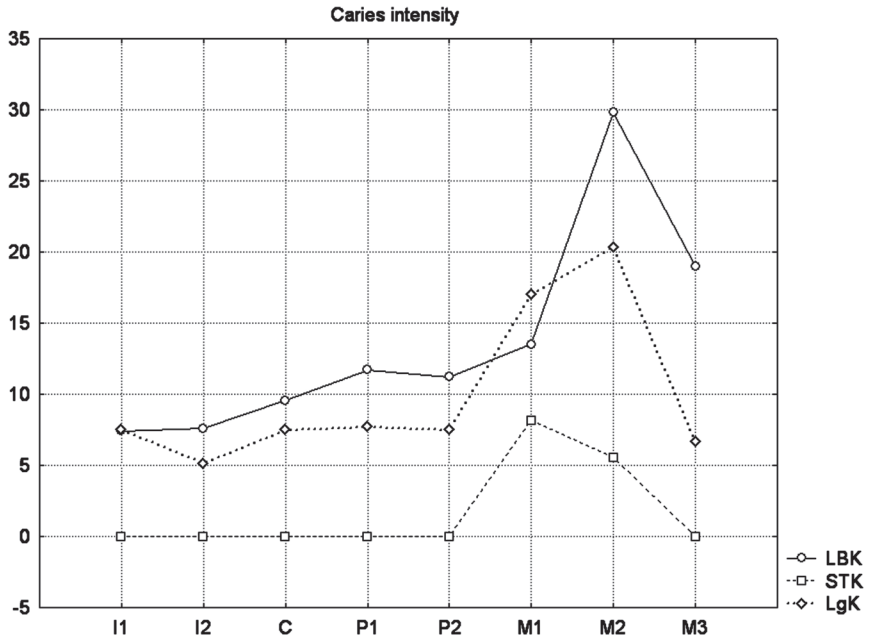
in whom we could record the highest occurrence of dental caries (n=8) among all the Neolithic individuals examined. Even if this individual would be excluded from the total number of investigated individuals of LBK, the caries intensity would decrease only to 11.9 whereby this oldest Neolithic phase would anyway show the highest values of I-CE, because the increase in this index is given above all by a high ratio of intravital tooth losses].

At the graveyard of Vedrovice (LBK) %C=5.4, while at Krškany (LBK) it was 6.6% (Frayer 2004), and in Neolithic populations from Northeast Hungary %C=6.3 (Ubelaker *et al.* 2006). The caries incidence (%C) at the LBK, STK and LgK settlements thus showed in all cases a lower value (3.1) approaching that one of the populations

TABLE 6. Caries intensity in adults (20+ yrs) of analysed groups from Neolithic settlements according to sex.

		C	Z	%C	E	A	%E	I-CE
	M	10	118	8.5	17	156	10.9	19.4
LBK	F	9	306	2.9	39	404	9.7	12.6
	M+F+?	19	461	4.1	56	611	9.2	13.3
	M	0	54	0.0	0	62	0.0	0.0
STK	F	2	83	2.4	1	96	1.0	3.5
	M+F+?	2	169	1.2	1	193	0.5	1.7
	M	4	99	4.0	0	109	0.0	4.0
LgK	F	2	126	1.6	22	170	12.9	14.5
	M+F+?	6	238	2.5	22	302	7.3	9.8
all		27	868	3,1	79	1106	7,1	10,2

FIGURE 2. Caries intensity in adults (20+ yrs) of analysed groups from Neolithic settlements according to tooth types.



from European Mesolithic sites (%C=2.6) (Frayer 2004). %E of the series from Northeast Hungary was 6.0 (Ubelaker *et al.* 2006), the final I-CE of this assemblage is herewith 12.3. For consideration, it is possible to mention a general absence of caries in skeletal series from Mesolithic and Neolithic sites in Ukraine (Lillie 1996). For comparison we cite the data from medieval sites in South Moravia: the I-CE value of the medieval population from Dolní Věstonice – Na Pískách (9th cent. AD) was 15.3 (%C=6.9, %E=8.4), and that one from Dolní Věstonice – Vysoká zahrada (12th cent. AD) then 23.5 (%C=8.4, %E=15.1) (Jarošová 2007).

With regard to tooth types, the highest I-CE values was found in second molars of the individuals from the LBK period, while in the STK people the highest I-CE value was recorded in the first lower right molar (*Table 5, Figure 2*). In all the cultures studied, higher I-CE values were recorded in mandibles, and the highest %C values in the right lower M2. All of the individuals of LBK and LgK from settlement burials showed the highest %C in M2 (12.0). At the graveyard of Vedrovice (LBK) the highest %C=12.6 was recorded in maxillary M1 and 10.3% in mandibular M2, while at Krškany (LBK) the highest value could be found in M1 (13.9% mandibular, 12.6% maxillary) (Frayer 2004).

Caries intensity with regard to sex. In eight adult males over 20 yrs in the series from the LBK period, 17 (10.9%) of total 156 preserved alveoli (A) were determined as intravital losses (E), and 10 teeth (8.5%) of the total number of 118 were carious.

In fifteen analysed females of LBK, 39 (9.7%) of total 404 preserved alveoli (A) were determined as intravital losses (E), and 9 (2.9%) of the total number of 306 teeth were carious. The caries intensity during the LBK period showed the value of 19.4 in males and 12.6 in females. The difference between both sexes is given by an increased rate of intravital losses and a higher dental cariosity in a male from Vedrovice (burial 10/74). If this male would be excluded from the analysis, the total I-CE value in the males of LBK would be 14.3 (%C=2.2; %E=12.1).

In two males from the following STK period we could detect neither caries nor intravital losses, and the final caries intensity of 0.0 means completely healthy teeth. In three investigated females from the STK period only two cases of caries and one intravital loss could be detected; the resulting I-CE is then 3.5.

The Late Neolithic period with the LgK culture shows the I-CE values of 4.0 (%C=4.0; %E=0.0) in four examined adult males, and 14.5 (%C=1.6; %E=12.9) in seven analysed females. Higher I-CE values in females are caused by an increased ratio of intravital losses (*Table 6*).

At the graveyard of Vedrovice (LBK) was %C=6.0 in males and %C=7.8 in females, at Krškany (LBK) this value in males was 6.0% too, while in females %C=5.2 (Frayer 2004), and in Neolithic populations from Northeast Hungary %C=6.7 in females and 5.6 in males (Ubelaker *et al.* 2006). The caries incidence (%C) at the LBK, STK and LgK settlements thus showed a lower value in all cases. At the LBK settlements a higher caries incidence in males (8.5%) that can be traced to the presence of 8 cases of caries in the male from Vedrovice, burial 10/74. If this male had not been included in the analysis, the total caries incidence in males from settlements would be 2.2%. The caries incidence in females from settlements was 2.9%, which is a relatively low value in comparison to the data acquired at the cemeteries of Vedrovice and Krškany. In the other Neolithic phases (STK, LgK) the caries incidence had always a lower value than in the Neolithic series investigated

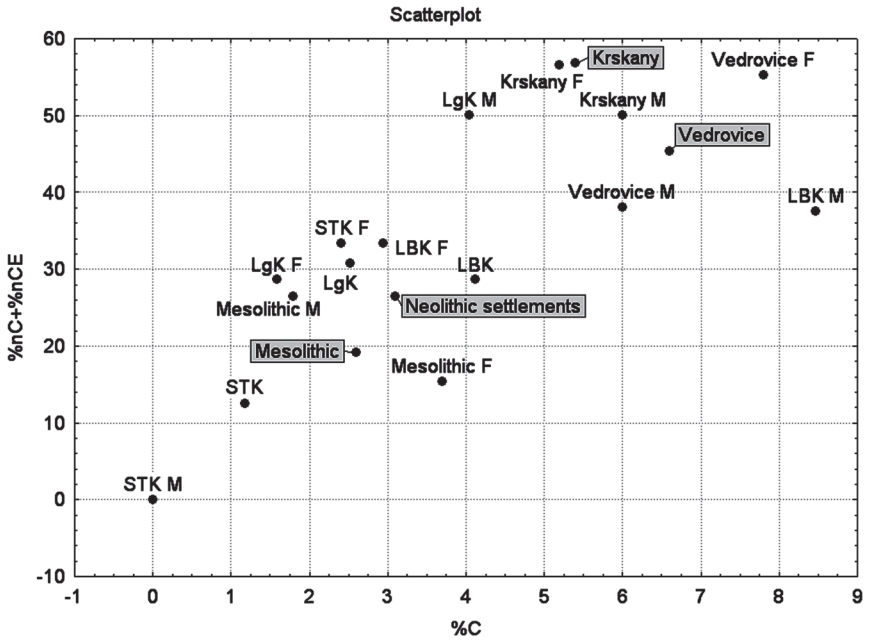


FIGURE 3. Scatterplot of caries incidence %C against %nC+%nCE in Mesolithic and Neolithic comparative samples.

by Frayer (2004). The values of settlement populations from the three periods treated approached rather the %C of Mesolithic European populations that were 3.7 in females and 1.8 in males (Frayer 2004, *Figure 3*). The percentage of intravital losses cannot be evaluated basing on the series investigated by Frayer; therefore neither the final I-CE can be compared. %E in the series from Northeast Hungary was 6.5 in males and 6.1 in females (Ubelaker *et al.* 2006), the resulting I-CE of the Hungarian series is then 12.1 for males and 12.8 for females.

Caries intensity with regard to age categories. For a complete evaluation of caries intensity with regard to age categories within the three investigated periods, which should prove an increase of values in time depending on rising age, we are lacking the proportional representations of individuals by particular categories. The data quoted are only fragmentary and with regard to them one should also consider the resulting I-CE values, which are in many cases very misrepresenting. All three populations coincide with each other in zero values of I-CE in the age category of 15–20 years, which means a completely healthy dentition of the individuals involved. In the LBK period about a third of all males over 35 years were affected by intravital loss or dental caries, and this index neither changed in a significant way after reaching the age of 50 and more. In the STK period only the teeth of females from Rybníky and Trstěnice were affected, in the remaining individuals one could register neither caries nor intravital losses. In the LgK period, extreme I-CE values were recorded in one examined female aged over 50 from Střelice (H1, Inv. No. 12) who showed an increased ratio of intravital losses. These data are to be treated with reserve, because their testimonial value is lowered by a small number of individuals in particular age categories (*Table 7*).

Caries frequency (F-CE)

The caries frequency, i.e. percentage of caries and intravital losses depending on the number of individuals, could be evaluated in 28 adults of LBK, 8 individuals of STK and 13 of LgK. In the female from Vedrovice (burial 9/74) only the alveoli stayed preserved, all of her teeth were lost ante-mortem. Among the individuals of LBK, less than a half were affected by caries or ante-mortem loss (LBK: F-CE=42.9), while in the STK period the caries or ante-mortem loss occurred in every fourth individual examined (STK: F-CE=25.0). In the LgK period more than a third of inhabitants were affected by any pathological change in teeth and jaws (LgK: F-CE=38.5). With regard to a small number of males and females in particular investigated periods, the F-CE values quoted are only of informative character. In spite of that, it can be determined that in the population from Moravian Neolithic settlements 38.8% of adult individuals were affected by dental caries or ante-mortem loss (*Table 8*). F-CE of the medieval population from Dolní Věstonice – Na Pískách was 59.6, in the 12th cent. population from Dolní Věstonice – Vysoká Zahrada F-CE=66.7 (Jarošová 2007), which means that medieval populations showed a higher cariosity than those in the Neolithic, and this caries occurred in individuals about 1.5 times more often than in Neolithic populations.

From among comparative data of similarly dated series we dispose only of %nC, i.e. the number of affected individuals represented in sample. Using the "total" (M+F+?) category, 56.8% of the individuals at Krškany (%nC: males=50.0; females 56.5) and 45.3% at Vedrovice (%nC: males=38.1; females 55.3) possess at least one caries, but these differences are not statistically significant. The ratio of males with at least one caries in the Mesolithic is 15.4% (Frayer 2004), but the number of afflicted individuals at the cemeteries of Krškany and Vedrovice

TABLE 7. Caries intensity in individuals (15+ yrs) of analysed groups from Neolithic settlements according to sex and age.

		C	Z	%C	E	A	%E	I-CE
	15–20 yrs	0	202	0.0	0	218	0.0	0.0
	M 20–35 yrs	0	57	0.0	0	59	0.0	0.0
	F 20–35 yrs	1	170	0.6	0	203	0.0	0.6
LBK	M 35–50 yrs	9	33	27.3	2	37	5.4	32.7
	F 35–50 yrs	0	22	0.0	5	29	17.2	17.2
	M 50+ yrs	1	28	3.6	15	60	25.0	28.6
	F 50+ yrs	8	114	7.0	34	172	19.8	26.8
total of LBK		19	626	4.7	56	778	7.2	11.9
	15–20 yrs	0	28	0.0	0	29	0.0	0.0
	M 20–35 yrs	0	27	0.0	0	32	0.0	0.0
	F 20–35 yrs	2	25	8.0	0	32	0.0	8.0
STK	M 35–50 yrs	0	27	0.0	0	30	0.0	0.0
	F 35–50 yrs	0	29	0.0	1	32	3.1	3.1
	M 50+ yrs	–	–	–	–	–	–	–
	F 50+ yrs	0	29	0.0	0	32	0.0	0.0
total of STK		2	197	1.0	1	222	0.5	1.5
	15–20 yrs	0	64	0.0	0	65	0.0	0.0
	M 20–35 yrs	4	99	4.0	0	109	0.0	4.0
	F 20–35 yrs	0	72	0.0	0	82	0.0	0.0
LgK	M 35–50 yrs	–	–	–	–	–	–	–
	F 35–50 yrs	1	51	2.0	3	64	4.7	6.6
	M 50+ yrs	–	–	–	–	–	–	–
	F 50+ yrs	1	3	33.3	19	24	79.2	112.5
total of LgK		6	289	2.2	22	344	6.6	8.8

TABLE 8. Caries frequency in adults (20+ yrs) of analysed groups from Neolithic settlements according to sex.

		nE	%nE	nC	%nC	nCE	%nCE	intact	% intact	F-CE	n
	M	1	12.5	1	12.5	2	25.0	4	50.0	50.0	8
LBK	F	3	20.0	2	13.3	3	20.0	7	46.7	53.3	15
	M+F+?	4	14.3	3	10.7	5	17.9	16	57.1	42.9	28
	M	0	0.0	0	0.0	0	0.0	2	100.0	0.0	2
STK	F	1	33.3	1	33.3	0	0.0	1	33.3	66.7	3
	M+F+?	1	12.5	1	12.5	0	0.0	6	75.0	25.0	8
	M	0	0.0	2	50.0	0	0.0	2	50.0	50.0	4
LgK	F	1	14.3	0	0.0	2	28.6	4	57.1	42.9	7
	M+F+?	1	7.7	2	15.4	2	15.4	8	61.5	38.5	13
all		6	12.2	6	12.2	7	14.3	30	61.2	38.8	49

is nearly three times higher. A similar pattern occurs in females from the Mesolithic, where the caries rates increase from the Mesolithic incidence of 26.5% to the Krškany/ Vedrovice value of 56.5/55.3% (Frayer 2004). These data are not the comparative samples to Czech Neolithic populations from *Table 8*, because the total number of affected individuals with at least one caries is to be counted in a different way (i.e. %nC + %nCE). These values thus are: LBK 28.6 (males 37.5; females 33.3), STK 12.5 (males 0.0; females 33.3), LgK 30.8 (males 50.0; females 30.8), and for the entire Neolithic population from settlements 26.5. In comparison to Frayer's data, %nC+%nCE from Czech settlements show slightly higher values than in the preceding period, but lower than those from the population of Vedrovice and Krškany (*Figure 3*).

Cariosity with regard to type and location of caries

In the Neolithic population from Moravia one could detect altogether 27 examples of caries on permanent teeth. In 10 (37.1%) cases it was coronal caries, in 13 (48.2%) cases cervical, and in 4 (14.8%) cases root caries. Only in one single case (3.7%) from total 24 findings, caries was located on the occlusal surface of a crown. This can be interpreted as the presence of an increased permanent dental wear, which resulted in the absence of this type of caries. In 9 (33.3%) cases caries was detected on non-occlusal medial or distal

TABLE 9. Dental caries type and localization.

Type	Localization		I1	I2	C	P1	P2	M1	M2	M3	all	%
crown	occlusal surface	(O)	0	0	0	0	0	0	1	0	1	3.7
	smooth surface caries	(M,D)	0	0	1	2	2	2	2	0	9	33.3
		(B,V)	0	0	0	0	0	0	0	0	0	0.0
cervix	cervical caries	(M,D)	0	0	2	0	0	1	6	2	11	40.7
		(B,V)	0	0	0	0	0	1	1	0	2	7.4
root	root caries		0	0	0	1	1	2	0	0	4	14.8
		all	0	0	3	3	3	6	10	2	27	100.0

TABLE 10. Dental caries in subadults (0–14 yrs) of analysed groups from Neolithic settlements.

	LBK		STK		LgK	
	0–6 yrs	7–14 yrs	0–6 yrs	7–14 yrs	0–6 yrs	7–14 yrs
number of examined children (n)	26	12	0	1	4	1
children with caries (nC)	0	1		0	0	0
% children with caries (%nC)	0.0%	8.3%	0.0%	0.0%	0.0%	0.0%
number of deciduous teeth	297	70	0	9	51	9
number of permanent teeth	85	219	0	15	16	14
number of all teeth (Z)	382	289	0	24	67	23
caries in deciduous teeth	0	1	0	0	0	0
caries in permanent teeth	0	0	0	0	0	0
number of all caries (C)	0	1	0	0	0	0
% caries in deciduous teeth (%C)	0.0%	1.4%	0.0%	0.0%	0.0%	0.0%
% caries in permanent teeth (%C)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% number of all teeth with caries (%C)	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%

coronal surfaces and in 11 (40.7%) cases on medial and distal cervical surfaces. One could thus detect 20 cases of proximal caries (74.1%) in total, which may be connected with deteriorated oral hygiene in this area. Minor part (7.4%) was represented by cervical caries on buccal and vestibular surfaces, which is closely related with the atrophy of alveoli due to advanced age in the examined individuals. In four cases one could record the coronal atrophy due to an advanced stage of caries, which resulted in the loss of dental crown and persistence of root. This effect is usually connected with alveolitis in form of periapical abscesses (*Table 9*). The sample size of these processes is too small to set out if these differences between earlier and later Neolithic are due to sample size or the effect of the introduction of new diets.

Caries in children until 15 years

In the series of 44 Neolithic children (age categories infans I, II and III (0–14 yrs)), in which 436 deciduous and 349 permanent teeth were examined, we found only a single case of caries on the tooth m2UR in an eleven-year-old child from Těšetice-Kyjovice (burial H15/1991) (*Table 10*). To compare, at the cemeteries of Vedrovice and Krškany caries was found only in one child in each population, always on the first deciduous molar (Frayer 2004).

Occlusal wear

The degree of dental wear could be evaluated in 48 adult individuals (see *Table 2*) from Neolithic settlements in Moravia. Only one adult female (Vedrovice 9/74) was excluded from the dental analysis, because of preserved alveoli, but missing teeth. During the comprehensive evaluation of dental wear on the dentition of adult individuals all permanent teeth was examined, both maxillary and mandibular, whereby only the belonging to one or the other sex was tested. This analysis involved 835 of the total number of 868 permanent teeth, representing 96.2% of the available permanent teeth of adult individuals found at Neolithic settlements in Moravia. Two different methods were used while assessing dental wear: incisors, canines and premolars (n=555) had been evaluated separately from molars (n=280).

The degree of dental wear in incisors, canines and premolars was evaluated after Smith (1984) separately for each of the three periods treated. As following from the results cited in *Table 11*, the highest degree of dental wear could be detected on the first upper incisors (I1max=5.3) in individuals of LBK, the second highest value of dental wear was recorded in individuals of STK and LBK on the first lower incisors (I1man=4.8). Generally, the highest values of dental wear could be detected in individuals from the earliest Neolithic (LBK), thereafter the wear gradually decreased in value, as visible from *Figure 3* in individuals of STK and LgK. In total it can be said that mean values of dental wear in incisors, canines and premolars vary between 3.9 and 5.3 in individuals of LBK, between 3.7 and 4.8 in individuals of STK, and between 3.5 and 4.3 in individuals of LgK.

TABLE 11. Basic statistics of dental wear in LBK, STK, LgK and Neolithic in all.

	LBK				STK				LgK				all			
	Mean	**Minimum**	**Maximum**	**Std.Dev.**	**Mean**	**Minimum**	**Maximum**	**Std.Dev.**	**Mean**	**Minimum**	**Maximum**	**Std.Dev.**	**Mean**	**Minimum**	**Maximum**	**Std.Dev.**
I1max	5.3333	3.00	8.00	1.7593	4.6667	3.00	6.00	1.0328	4.0000	3.00	6.00	1.1952	4.8276	3.00	8.00	1.5600
I2max	4.2500	2.00	8.00	2.0166	4.6000	2.00	6.00	1.5166	3.2500	2.00	5.00	1.2817	4.0345	2.00	8.00	1.7825
Max	4.5000	2.00	7.00	1.5728	4.5000	3.00	6.00	1.2247	3.5556	2.00	6.00	1.4240	4.2571	2.00	7.00	1.5018
P1max	4.5909	2.00	8.00	1.9188	4.1667	3.00	6.00	1.1690	4.2000	2.00	6.00	1.8135	4.4211	2.00	8.00	1.7650
P2max	4.4348	2.00	8.00	1.8297	4.1667	3.00	6.00	1.1690	4.0000	2.00	6.00	1.4142	4.2821	2.00	8.00	1.6214
I1man	4.7500	3.00	8.00	1.5275	4.8000	3.00	6.00	1.0954	4.3333	3.00	6.00	1.0328	4.6667	3.00	8.00	1.3301
I2man	4.1667	2.00	7.00	1.3827	4.3333	3.00	6.00	1.2111	4.0000	3.00	5.00	0.8165	4.1613	2.00	7.00	1.2137
Cman	3.9444	1.00	6.00	1.1618	4.0000	2.00	6.00	1.5492	3.5556	2.00	5.00	1.0138	3.8485	1.00	6.00	1.1758
P1man	4.0000	2.00	6.00	1.3284	3.6667	2.00	6.00	1.3663	3.5000	2.00	6.00	1.4142	3.8125	2.00	6.00	1.3305
P2man	4.0000	2.00	6.00	1.3038	4.0000	2.00	6.00	1.2910	3.8000	2.00	6.00	1.2293	3.9474	2.00	6.00	1.2509
M1max	26.1500	12.00	38.00	6.1497	25.5000	21.00	31.00	4.2778	24.6667	16.00	34.00	5.6125	25.6571	12.00	38.00	5.6253
M2max	19.0667	8.00	37.00	6.9020	16.6000	12.00	22.00	3.6469	14.0000	9.00	17.00	3.3912	17.0690	8.00	37.00	5.8489
M3max	11.9167	8.00	16.00	2.8749	9.5000	8.00	10.00	1.0000	9.6667	8.00	14.00	2.3381	10.8636	8.00	16.00	2.6779
M1man	26.8889	20.00	37.00	5.2456	25.0000	22.00	30.00	2.5635	23.6667	16.00	30.00	4.3589	25.6286	16.00	37.00	4.6405
M2man	21.3125	8.00	32.00	6.7302	19.8333	17.00	23.00	2.3166	16.2500	10.00	25.00	5.8737	19.6667	8.00	32.00	6.1157
M3man	15.7143	10.00	21.00	4.4987	12.4000	10.00	18.00	3.5777	9.5714	5.00	16.00	3.3594	12.5789	5.00	21.00	4.5499

TABLE 12. Mean values of dental wear according to age in LBK, STK, LgK, and Neolithic in all.

	20–35 yrs				35–50 yrs				50+ yrs			
	LBK	**STK**	**LgK**	**All**	**LBK**	**STK**	**LgK**	**All**	**LBK**	**STK**	**LgK**	**All**
I1max	4.3750	4.0000	3.8333	4.1176	4.0000	5.0000	4.5000	4.5000	7.4000	6.0000	–	7.1667
I2max	3.1111	3.5000	3.0000	3.1176	3.5000	5.0000	4.0000	4.1667	6.6000	6.0000	–	6.5000
Cmax	3.3000	3.6667	3.0000	3.2500	4.7500	5.0000	5.5000	5.0000	6.3333	6.0000	–	6.2857
P1max	3.2500	3.3333	3.4286	3.3182	4.3333	4.5000	6.0000	4.8571	7.0000	6.0000	6.0000	6.7778
P2max	3.1538	3.3333	3.5714	3.3043	4.6667	4.5000	5.0000	4.7143	6.7143	6.0000	5.0000	6.4444
I1man	3.8750	4.0000	4.2500	4.0000	5.3333	5.0000	4.5000	5.0000	5.8000	6.0000	–	5.8333
I2man	3.4444	3.3333	3.8333	3.5556	3.6667	5.0000	5.0000	4.3333	5.5000	6.0000	–	5.5714
Cman	3.2000	2.6667	3.2857	3.1500	4.5000	5.0000	4.5000	4.6667	5.0000	6.0000	–	5.1429
P1man	3.1818	2.6667	3.1667	3.1000	5.0000	4.0000	4.5000	4.5000	5.4000	6.0000	–	5.5000
P2man	3.1667	3.0000	3.4286	3.2273	4.3333	4.3333	4.6667	4.4444	5.5000	6.0000	–	5.5714
M1max	22.4167	23.6667	22.0000	22.4762	28.0000	25.5000	30.5000	28.0000	33.0000	31.0000	29.0000	32.2500
M2max	14.8889	14.5000	13.2857	14.2222	26.0000	16.0000	16.5000	18.2000	25.2000	22.0000	–	24.6667
M3max	11.0000	10.0000	8.5000	10.0769	10.5000	9.0000	12.0000	10.5000	15.0000	–	–	15.0000
M1man	23.2222	23.5000	21.8333	22.8421	27.0000	26.6667	27.3333	27.0000	31.5714	26.0000	–	30.8750
M2man	15.8750	19.0000	14.1667	15.6250	23.0000	19.6667	22.5000	21.1667	27.2857	22.0000	–	26.6250
M3man	12.7500	11.3333	8.2000	10.5000	21.0000	10.0000	13.0000	14.2500	19.0000	18.0000	–	18.6667

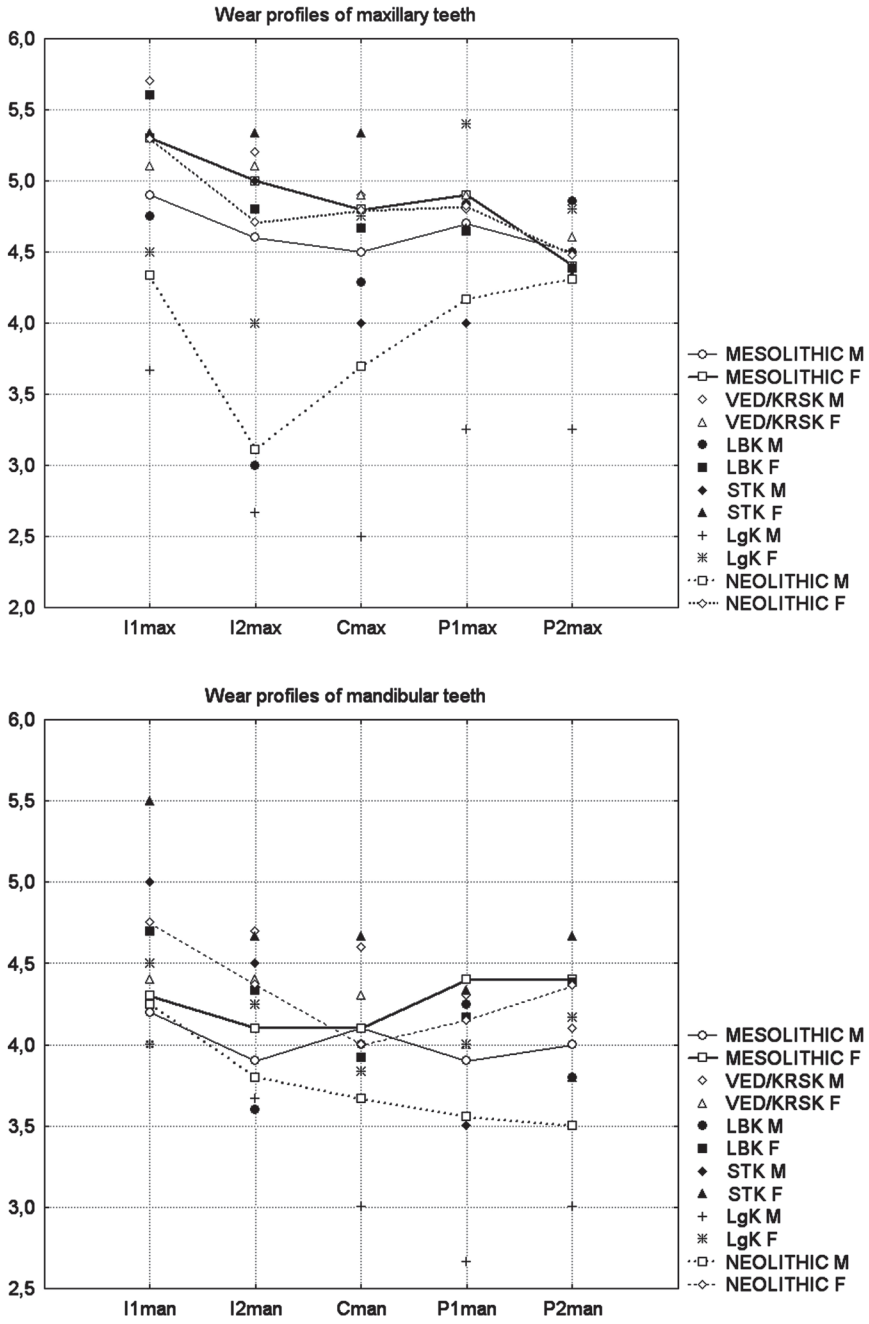


FIGURE 4. Mean values of the dental wear of incisors, canines and premolars in LBK, STK, and LgK in comparison to LBK populations from Vedrovice/ Krškany and mean values of occlusal wear in Mesolithic population from Europe.

The degree of dental wear in molars was assessed after Scott (1979) separately for each of the three investigated periods. As following from the results cited in *Table 11*, the highest degree of dental wear was detected on the first lower molars (M1man=26.9) in individuals of LBK, the second highest values of dental wear could be recorded in individuals of STK and LBK on the first upper molars (*Figure 4*). According to basic statistical values and the detected maximum (*Table 11*), the molars of LBK individuals can be held for the most worn teeth – these values range from 11.9 to 26.9, while in individuals of LgK it is from 9.7 to 23.7. As visible from *Figures 4* and *5*, the degree of dental wear was lowest in individuals of LgK, but these data are affected to a great extent by the absence of males aged over 35 (see *Table 12*). Dental wear according to the age categories' was present in higher degrees in young individuals under 35 in earlier Neolithic in comparison to late period. This may reflect changes in diet in individuals of the same age between LBK and LgK periods.

Dental wear with regard to sex

In Neolithic populations, the degree of dental wear had been examined in all investigated tooth types separately for males and females whereby in females one could detect almost always a higher wear than in males. The highest mean values of dental wear were detected in females of LBK on the first upper incisors (I1max=5.6). The second highest values of dental wear, in comparison to the other

TABLE 13. Mean values of dental wear according to sex (Non-parametric Mann-Whitney U Test, marked tests are significant at p<0.05).

	LBK			STK			LgK			all		
	mean M	**mean F**	**p-level**	**mean M**	**mean F**	**p-level**	**mean M**	**mean F**	**p-level**	**mean M**	**mean F**	**p-level**
I1max	4.7500	5.6000	0.3488	4.5000	5.3333	0.1967	3.6667	4.5000	0.3543	4.3333	5.2941	0.0779
I2max	3.0000	4.8000	0.1197	5.0000	5.3333	1.0000	2.6667	4.0000	0.1460	3.1111	4.7059	0.0258*
Cmax	4.2857	4.6667	0.6671	4.0000	5.3333	0.1967	2.5000	4.7500	0.0360*	3.6923	4.7895	0.0536
P1max	4.8333	4.6429	0.9665	4.0000	4.6667	0.5536	3.2500	5.4000	0.0398*	4.1667	4.8182	0.2004
P2max	4.8571	4.3846	0.8093	4.5000	4.3333	0.7671	3.2500	4.8000	0.0948	4.3077	4.4762	0.5398
I1man	4.0000	4.7000	0.4670	5.0000	5.5000	0.3173	4.0000	4.5000	0.6228	4.2500	4.7500	0.3605
I2man	3.6000	4.3333	0.3884	4.5000	4.6667	0.7671	3.6667	4.2500	0.3496	3.8000	4.3684	0.2874
Cman	4.0000	3.9231	1.0000	4.0000	4.6667	0.5428	3.0000	3.8333	0.2207	3.6667	4.0000	0.3642
P1man	4.2500	4.1667	0.9001	3.5000	4.3333	0.5428	2.6667	4.0000	0.2188	3.5556	4.1500	0.1749
P2man	3.8000	4.3846	0.4183	3.5000	4.6667	0.1967	3.0000	4.1667	0.2228	3.5000	4.3636	0.0450*
M1max	26.400	26.357	0.9261	25.5000	25.6667	0.7671	20.0000	27.0000	0.1011	24.3000	26.4091	0.2986
M2max	18.000	19.333	0.6642	17.0000	16.3333	0.5536	13.2500	14.7500	0.8809	15.6667	17.8947	0.4586
M3max	11.000	12.556	0.4744	9.0000	10.0000	0.3173	8.0000	10.5000	0.1336	9.3333	11.6667	0.0429*
M1man	29.333	26.667	0.4248	24.0000	25.0000	0.7671	21.6667	24.8000	0.2938	25.1250	25.9500	0.6449
M2man	20.750	21.455	0.6937	21.5000	19.6667	0.2482	16.0000	16.4000	0.8786	19.3333	19.8421	0.7861
M3man	21.000	15.000	1.0000	10.0000	12.6667	1.0000	7.6667	11.0000	0.1947	10.8000	13.0833	0.2897

investigated groups, were recorded in females of STK on the upper incisors and canines and the first lower incisors. In the male groups of LBK one could detect on all teeth except the upper incisors, canines and lower incisors a lower value of dental wear than in females from the same period. During the STK period, higher values of dental wear have been usually recorded in females, which is a trend proved in the following Lgk period in all tooth types. The non-parametric Mann-Whitney test confirmed the statistically significant difference between the wear in males and females only in a few teeth from the LgK period and in a general assessment of the Neolithic (*Table 13*). These detections, however, are to be taken only in broad outline because within the frame of the three periods investigated we lack any balanced population sample (see *Table 2*). This fact distorts mainly the results from the LgK period where the category of males aged over 35 is absent. The values of dental wear in the groups of males and females from the STK period are influenced by the predominance of a female over 50, which shift the higher values of dental wear in favour of females.

A comparison with the LBK populations from Vedrovice and Krškany, investigated by Frayer (2004), reveals that the cumulative data of both these populations together (VED/KRSK), concerning the wear on incisors, canines and premolars, were almost in all cases higher than the wear in individuals from investigated settlements in Moravia (an exception was represented by the wear values in the first upper and lower incisors, which were higher in females buried at settlements). According to Frayer, the males from

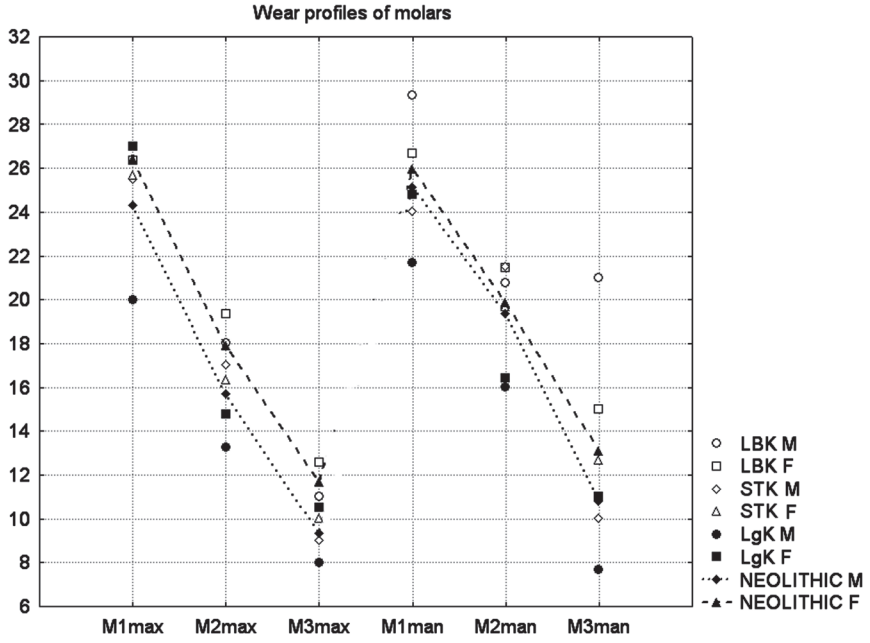


FIGURE 5. Mean values of the dental wear of molars in LBK, STK, and LgK.

FIGURE 6. Occlusal view from Hluboké Mašůvky pit 654/H2/2003 (a), pit 654/H1/2003 (b), and Modřice pit 551/H800/2004 (c), pit 734/H801/2004 (d).

Vedrovice and Krškany showed higher wear values than females. In European Mesolithic populations a higher wear was detected in females, which is a trend occurring as well in Neolithic populations from Moravian settlements. The differences between sexes were statistically insignificant in all the LBK populations examined. *Figures 4a, b* and *5* show a comparison between Neolithic and Mesolithic populations with regard to dental wear.

Manipulative incisor wear

On the upper anterior teeth of adults from Neolithic settlements it is possible to detect in many cases an increased peculiar wear pattern on occlusal surfaces. Macroscopically these examples can be divided into the occlusal deep grooves in mesio-distal direction (modifications involving transversely oriented grooves), which are located mainly on the upper anterior teeth (e.g. in two females from Modřice; for comparison see Larsen 1985, 1997: Figure 7.8), and the vestibulo-palatal flat wear with traces of polishing located usually on the palatal surface of first upper incisors (e.g. in two females from Hluboké Mašůvky). These changes were almost always bilateral, with a different enamel wear to dentine and with moderate deviations from two main directions. In three individuals the use of teeth for possibly manipulative purposes were detect, in both upper and lower teeth. In several individuals aged over 50 even an excessive wear of the anterior teeth was recorded (i.e. Modřice), progresses to deep channels into the enamel up to the cemento-enamel junction. These cases of excessive dental wear were never associated with dental caries or other dental pathologies, even if the excessive wear in anterior teeth of a female from Modřice (pit 551/H800/2004) caused the opening of pulp chamber.

With regard to the macroscopically occurrence of this pattern of wear we can assume that teeth had been used for manipulative purposes throughout the whole Neolithic, but mainly in the LBK period. The occurrence in following time periods is rather sporadic. In the LBK and STK periods these evidences were detected only in females, in the LgK period we could record this custom also in a male. Regarding the age categories, the use of teeth as a tool can be reliably proved in young adult females already. Furthermore, in individuals from similar settlements had even an identical form of peculiar dental wear (see Hluboké

TABLE 14. Individuals with grooved anterior teeth (max = maxilla, man = mandible).

Individual		Manipulative wear of anterior teeth	Main direction	Tooth analysed by SEM	Direction	N	Distance	
							Mean	Std. Deviation
Držovice H2/1998	LBK, F 25–30 yrs	max. man	?			?	?	?
Hluboké Mašůvky pit 654/H1/2003	LBK, F 25–30 yrs	max	VP	I1UL	MD	5	171.54	174.53
					VP	22	159.97	112.11
					M	7	98.94	57.21
					D	18	92.73	89.33
					Total	52	129.59	108.57
Hluboké Mašůvky pit 654/H2/2003	LBK, F 18–20 yrs	max	D	I1UL	MD	2	63.49	39.09
					VP	13	202.91	161.77
					M	4	137.62	73.36
					D	22	143.14	133.37
					Total	41	157.67	137.46
Modřice pit 551/H800/2004	LBK, F 50–55 yrs	max	MD	I1UR	MD	36	188.28	136.32
					VP	3	54.54	31.66
					M	3	56.35	25.51
					D	2	116.80	37.64
					Total	44	166.92	132.17
Modřice pit 734/H801/2004	LBK, F 50–55 yrs	max. man	MD	I1UR	MD	21	172.72	125.78
					VP	2	34.43	7.05
					M	2	45.54	14.81
					D	16	122.63	187.61
					Total	41	140.22	151.01
Těšetice Kyjovice H11/1986	LBK, F 45–55 yrs	max. man	?			?	?	?
Vedrovice, Za dvorem (pit 37) H1/1985	LBK, F 20–25 yrs	max	VP/D?			?	?	?
Vedrovice, Za dvorem (graveyard) H6/1988	LBK, F 50+ yrs	man	MD?			?	?	?
Vedrovice, Za dvorem (graveyard) H10/1989	LBK, F 20–25 yrs	max?	VP?			?	?	?
Vedrovice, Za dvorem (settlement) H11/1997	LBK, F 50+ yrs	max	D?			?	?	?
Rybníky Inv.No. 35/1939	STK, F 30–35 yrs	max	MD	I1UL	MD	41	199.19	128.34
					VP	11	180.28	106.42
					M	21	111.01	58.98
					D	19	122.24	108.42
					Total	92	160.91	114.74
Trstěnice Inv.No. 36/1957	STK, F 35–40 yrs	max	D	I1UL	MD	5	57.80	20.64
					VP	16	71.39	30.82
					M	14	118.03	87.80
					D	21	58.05	28.60
					Total	56	76.83	54.93
Těšetice Kyjovice H3/1972	LgK, M 24–30 yrs	max	?			?	?	?
Těšetice Kyjovice KH25/2001	Eneolithic, F 20–25 yrs	max	VP	I1UR	VP	9	203.58	127.17
					M	3	107.84	38.53
					Total	12	179.64	117.92

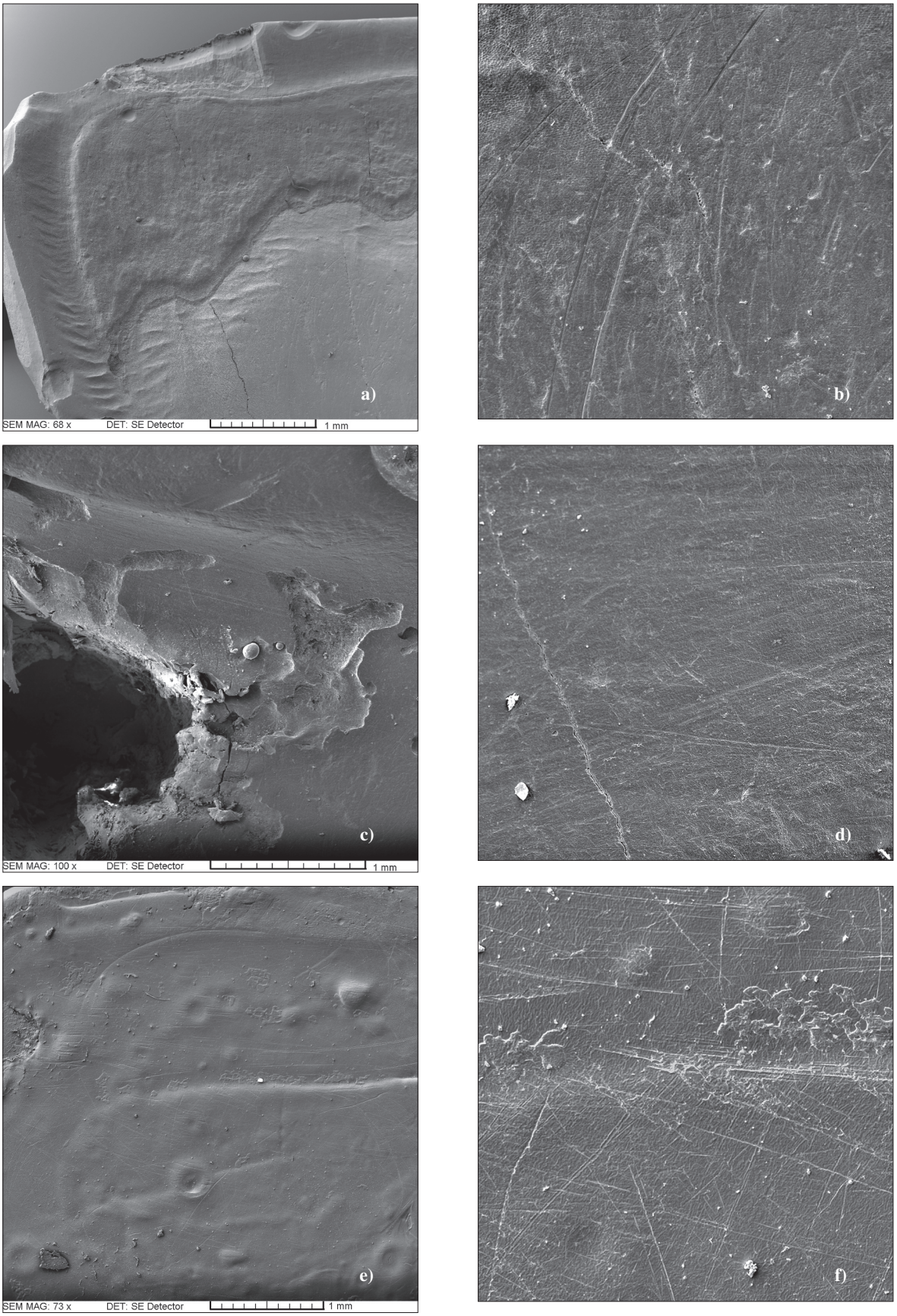


FIGURE 7. Scanning electron microscope image of the lingual surfaces of maxillary incisors from Hluboké Mašůvky pit 654/H2/2003 (a, b), Modřice pit 551/H800/2004 (c, d), and Rybníky Inv. No. 35/1939 (e, f). Micrographs b, d, f cover an area of 0.56 mm^2.

Mašůvky, Modřice, *Figure 6a–d*). In order to approximate how the teeth were used, an analysis on microscopic level was performed in 7 tooth replicas with well-preserved dental enamel using SEM. Micrographs were taken at 226× magnification on the incisal third of the lingual surface of the tooth crown. All images were subsequently enhanced with Adobe Photoshop 8.0, where the selected area of 0.56 mm^2 was cropped. The data acquisition was adopted according to the standards used for buccal dental microwear research (Lalueza Fox, Pérez-Pérez 1993; Lalueza *et al.* 1993, 1996; Galbany *et al.* 2004; Jarošová *et al.* 2006), only with the difference that the variables were determined with respect to given tooth's orientation. The examined variables describe the number, length and standard deviation of striations of the mesio-distal (MD), vestibulo-palatal (VP), medial (M) and distal (D) directions with respect the interval of 45-degree intervals of orientation from 0° to 180° (*Figure 7a–f*). The microscopic analysis in remaining individuals couldn't be carried out, due to the post-mortal microscopic defects of their enamel surface. The number of striations on the examined area varies between 12 and 92, which most probably refers to a different abrasiveness of the organic matter used. The average length of striations ranges from 76.83 to 179.64 μm (see *Table 14*).

As it is possible to detect, the findings of this survey on microscopic level are not very homogenous. This arise a discussion, whether there was a manipulative dental wear in Moravian Neolithic at all. On one hand against this hypothesis stand scratches that in some cases resemble dietary ones (see *Figure 7f*), or are convoluted to interpret (i.e. *Figure 7d*), mainly because of smaller number of scratches. On the other hand, some of these individuals show clearly peculiar dental wear both on microscopic and macroscopic level (see Hluboké Mašůvky example: *Figure 6a, 6b*, and *7b*). Moreover individuals from the same sites show the same type of peculiar dental wear that cannot be caused coincidentally (Modřice and Hluboké Mašůvky cases).

In spite of various pros and cons, the setting out of manipulative dental wear in Moravian Neolithic can be right, even if in many cases is more than disputatious and deserve additional revision, when more comparable data are available.

The comparison between the incidence of atypical grooves on anterior teeth from Neolithic settlements and the results of the LBK graveyard at Vedrovice reveals identical conclusions. The use of teeth as a tool in the population from the LBK graveyard at Vedrovice was detected only in adult females (in three cases on both maxilla and mandible), while in the population from Krškany the manipulative use of teeth as a tool could be registered not only in females, but also in two males and even in children already (Frayer 2004). As Frayer (2004) has pointed out, this type of wear is undoubtedly a remnant of some special type of dental manipulation that proves distinct forms in pattern and object manipulation (see Molnar 1972, Larsen 1985, Schultz 1977). This high degree of polish and the orientation of degree may indicate also transversely passing of some type of flexible material over the anterior teeth in a repetitive and habitual fashion in processing materials as sinews for bow strings or plant fibres for cordage or basketry (Larsen 1997: 259), especially in the way the occlusal incisor surfaces are deeply etched in older individuals (see Modřice case).

Dental enamel hypoplasia (DEH)

The prevalence of dental enamel hypoplasia had been examined on 346 teeth (i.e. on 243 permanent and 103 deciduous incisors and canines), in 76 (73.8%) of available 103 individuals with present anterior dentition. Performing the complete assessment of dental enamel hypoplasia on

TABLE 15. Prevalence of individuals displaying dental enamel hypoplasia (acute and chronic type).

		DEH absence	DEH presence	% DEH presence	Individuals analysed	Acute DEH lines/pits	Chronic DEH	Both acute and chronic DEH
LBK	subadults	28	4	12.5	32	3/0	1	0
	M	6	0	0.0	6	0/0	0	0
	F	10	2	16.7	12	0/1	1	0
	?	1	1	50.0	2	1/0	1	1
total of LBK		45	7	13.5	52	4/1	3	1
STK	subadults	1	1	50.0	2	1/0	0	0
	M	1	0	0.0	1	0/0	0	0
	F	4	0	0.0	4	0/0	0	0
	?	1	0	0.0	1	0/0	0	0
total of STK		7	1	12.5	8	1/0	0	0
LgK	subadults	4	2	20.0	5	1/0	1	0
	M	3	0	0.0	3	0/0	0	0
	F	5	1	16.7	6	1/0	0	0
	?	1	0	0.0	0	0/0	0	0
total of LgK		13	3	18.8	16	2/0	1	0
all		65	11	14.5	76	7/1	4	1

at least one examined tooth (central or lateral incisors and canines) we evaluated: 1. the presence or absence of dental enamel hypoplasia (DEH), 2. acute (A DEH) and chronic (CH DEH) stressors, 3. the type of hypoplastic defect (*Table 15*).

Dental enamel hypoplasia with regard to individuals

65 individuals (85.5%) from all three Neolithic periods showed no hypoplastic defects, in 11 individuals (14.5%) with permanent teeth at least one hypoplastic defect on complete or partly preserved dentitions was detected. In 8 individuals one could register displays of acute stressors (i.e. lines, stripes, pit lines), and in 4 individuals the stressors of chronic character whereby in one of them displays of both acute and chronic stressors were present (adult individual from Olšany K506/H1/2001); in one adult female from Modřice (pit 734/H801/2004) from the LBK period one could detect an acute type of hypoplasia in form of pits (Pl). The highest occurrence of hypoplastic defects on enamel with regard to the number of individuals in population was recorded in the inhabitants of LgK settlements (18.8%), somewhat lower values were registered in the LBK period (13.5%). The absolutely lowest values of the incidence of enamel hypoplasia appeared in the individuals from STK settlements (12.5%). The non-parametric Kruskal-Wallis ANOVA test didn't prove any statistically significant differences in the presence or absence of DEH with regard to the three Neolithic periods treated.

None of the examined children with deciduous teeth showed displays of hypoplasia.

Hypoplastic changes in the individuals of LBK were recorded on permanent teeth of children (12.5%) and females (16.7%). In males from this period we are lacking a sufficient amount of data for the determination of influences, which caused an irregular forming of dental enamel in the childhood. In the following periods with STK and LgK cultures we couldn't detect any hypoplastic changes on dental enamel of adult individuals. The presence of DEH in children of this period was sporadic, and with regard to a small number of examined individuals we cannot make any detailed conclusions for the age category infans (*Table 15*).

In several populations the occurrence of hypoplasia couldn't be detected at all (e.g. Brno – Starý Lískovec: 7 individuals (in 2 of them DEH couldn't be identified), Hluboké Mašůvky: 4 individuals), in several others it was only sporadic (e.g. Vedrovice: 1 of 16 individuals of LBK showed DEH, in 5 individuals DEH couldn't be determined; Těšetice-Kyjovice: 1 of 12 individuals showed DEH, in 10 individuals DEH couldn't be determined; Žádovice: 1 of 9 individuals showed DEH, in 1 individual DEH couldn't be determined). In several populations DEH was present usually only in one individual of the whole population or site (e.g. Mod ice, Moravský Krumlov a. o.) but with regard to a low number of individuals from the site and time treated, the percentage of population cannot be held for a relevant testimony on the overall fitness and nutritional condition of the population. Scoring the occurrence of dental enamel hypoplasia in the LBK, STK and LgK populations, which don't represent any comparable samples in terms of number and population, could easily cause false conclusions because the differences in their prevalences are in no way distinctive.

As mentioned above, in the examined sample of Neolithic population from settlements the dental enamel hypoplasia could be recorded by 14.5%. In populations buried at cemeteries of Vedrovice and Krškany, 18.2% individuals with permanent dentition showed at least some evidence of hypoplasia, while on deciduous teeth in these populations no hypoplastic defect was detected (Frayer 2004). In the population from Northeast Hungary no evidence for hypoplasia on deciduous teeth was detected as well (Ubelaker *et al.* 2006). In this population DEH was recorded in 5 of total 71 individuals, it means that this population was living in extremely favourable conditions, which is also proved by the detection of moderate type of DEH: only linear type of hypoplasia was recorded. To compare, some data from later periods are cited – e.g. in the population from Dolní Věstonice – Na Pískách from the 9th century DEH was present in 33% of individuals, in the population from Dolní Věstonice – Vysoká zahrada from the 12th century it was 39.7% (Jarošová 2006, 2007). The medieval population from Znojmo – Hradiště from the 11th to 13th centuries was affected by hypoplasia by 65.3%, the population from the same site living in 17th to 18th centuries was even affected by 78.6% (Jarošová 2003, 2005). From this comparison clearly follows that the Neolithic populations lived in a very healthy environment, and during the childhood their organisms hadn't been exposed to such a distinctive form of stressors like non-specific inflammatory diseases or nutritional insufficiencies, as it was proved in many cases from later periods.

Dental enamel hypoplasia with regard to teeth

20 (8.2%) from the total number of 243 examined permanent teeth (in 76 individuals with complete or incomplete dentition) showed at least one hypoplastic defect. Among the defects detected the acute stressors (80.0%) predominated over the events of chronic character (20.0%). Hypoplasia had been mostly detected on the lower canines (18.9%), to a lesser degree on the upper canines (9.8%) and the upper central incisors (9.1%). Lateral incisors showed a similar prevalence of DEH (upper I2 4.7% and lower I2 4.9%). The lowest occurrence of DEH was recorded on the lower I1 (2.7%) (see *Figure 8*).

None of the total number of 103 examined deciduous teeth showed displays of dental enamel hypoplasia, which fact is corresponding to the occurrence of DEH on deciduous teeth in the series from Northeast Hungary (Ubelaker *et al.* 2006).

The prevalence of hypoplasia in particular cultures and types of permanent teeth are cited in *Table 16*. With regard to types of permanent teeth, dental enamel hypoplasia occurred most often in individuals of STK (13.5%). In the

TABLE 16. Prevalence of permanent teeth displaying dental enamel hypoplasia (acute and chronic type).

		Deciduous teeth	Permanent teeth					
		DEH absence	DEH absence	DEH presence	% DEH presence	teeth analysed	acute DEH lines/pits	chronic DEH
LBK	maxI1	15	25	2	7.4	27	2/0	0
	maxI2	15	28	1	3.4	29	1/0	0
	maxC	17	23	3	11.5	26	2/0	1
	manI1	14	24	0	0.0	24	0/0	0
	manI2	15	25	1	3.8	26	1/0	0
	manC	18	17	3	15.0	20	0/1	2
	permanent teeth		142	10	6.6	152	6/1	3
	deciduous teeth	94		0	0.0	94	0/0	0
total of LBK			236	10	4.1	246	6/1	3
STK	maxI1		7	1	12.5	8	1/0	0
	maxI2		4	1	20.0	5	1/0	0
	maxC		6	0	0.0	6	0/0	0
	manI1		4	1	20.0	5	1/0	0
	manI2		6	1	14.3	7	1/0	0
	manC	1	5	1	16.7	6	1/0	0
	permanent teeth		32	5	13.5	37	5/0	0
	deciduous teeth	1		0	0.0	1	0/0	0
total of STK			33	5	13.2	38	5/0	0
LgK	maxI1	1	8	1	11.1	9	1/0	0
	maxI2	1	9	0	0.0	9	0/0	0
	maxC	1	8	1	11.1	9	1/0	0
	manI1	1	8	0	0.0	8	0/0	0
	manI2	1	8	0	0.0	8	0/0	0
	manC	3	8	3	27.3	11	2/0	1
	permanent teeth		49	5	9.3	54	4/0	1
	deciduous teeth	8		0	0.0	8	0/0	0
total of LgK			57	5	8.1	62	4/0	1
all		103	223	20	8.2	243	15/1	4

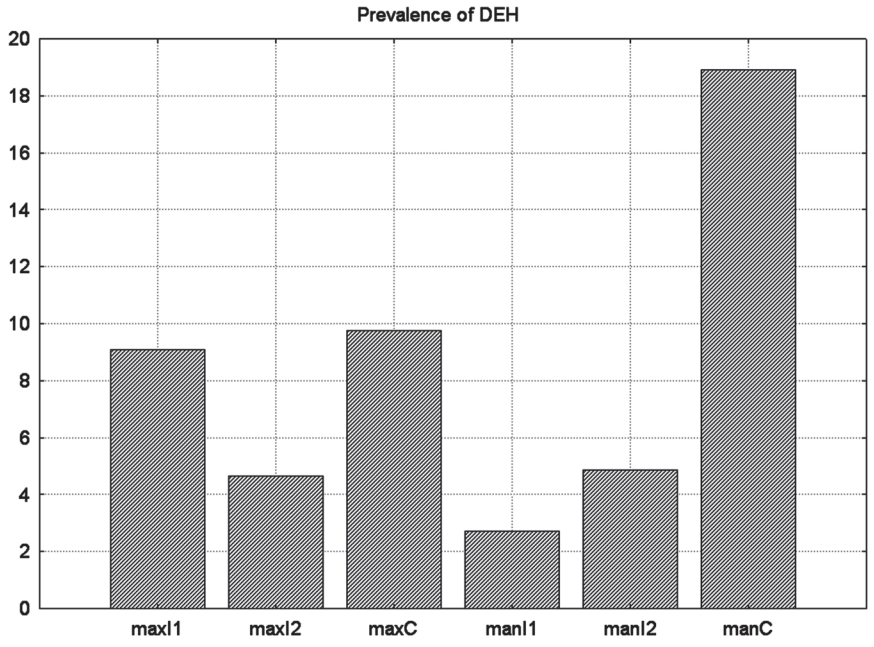


FIGURE 8. Prevalence of enamel hypoplasia by tooth type.

LgK culture the percentage of teeth affected by hypoplastic defects was 9.3%, and the individuals of LBK showed the lowest prevalence of hypoplastic defects (6.6%). An apparent increase in hypoplasia in the STK period is caused by the fact that hypoplasia is present only in one individual from this period. This subadult individual from Vyškov (H37/1960) showed an acute form of hypoplasia on all five of his examined tooth types, and that's why the value got increased. %DEH in the series from Northeast Hungary was 1.4 (Ubelaker *et al.* 2006). Considering the occurrence of DEH on incisors and canines, the hypoplasia prevalence from this location was 2.1%, which is a four times lower value than that in the inhabitants of Moravian settlements.

DISCUSSION

The main source of carbohydrates in the oldest agrarian populations was probably starch (polysaccharide), which is contained above all in cereals, roots and seeds. Since the Neolithic population was dependent in its food sources to a greater part probably on agrarian products, cereals can be considered as the main source of carbohydrates in their diet. Other possible sources could have been honey or fruits. The emergence of caries depended on two cardinal factors: pH of dental plaque and the composition of carbohydrates contained in the consumed food. If the acidity of dental plaque exceeded the limit value, a disturbance of dental enamel and the emergence of caries occurred (Hillson 1979: 149–150). In all populations from Moravian settlements the caries and its impact in form of intravital losses were detected on 10.3% of teeth and in 38.8% of individuals, which is a relatively low value, compared to later medieval populations. The maximum caries intensity occurred in the LBK period (13.3), in the following STK period the I-CE was lowest (1.7) while in the LgK period it became slightly increased (9.8). The caries frequency followed this trend, too. The consumed food must have been of a much denser consistence than today, because due to an increased enamel wear dental caries occurred less often on the occlusal surface than on the other dental surfaces. In children one could detect caries just in one single case, from which we cannot draw any solid conclusions.

In general, the highest values of dental wear were recorded in individuals of LBK, namely in females. The individuals of this oldest Neolithic period thus must have subsisted on a highly abrasive food containing maybe some unspecified abrasive matter, which resulted in excessive coronal wear. In following periods probably a change in composition or preparation of food occurred, which found reflection in dental wear patterns. The highest degree of dental wear detected in the LBK period, with accent on the first upper incisors, most probably relates to the use of teeth as a tool in this oldest Neolithic period. In the following time span with STK and LgK cultures this custom had been probably gradually abandoned until completely declined. According to mean values of dental wear on the upper incisors recorded, it is likely that at Neolithic settlements it was above all the adult females of all age categories who used teeth as a tool. The performed precise analysis on microscopic level revealed different directions of wear as well as different abrasiveness of the material treated; however, for a concrete determination of the material we are lacking any comparative experimental data, even if some studies are already dealing with this problem (Minozzi 1994, Frayer, Minozzi 2002).

In the Neolithic population from settlements the dental enamel hypoplasia was recorded by 14.5% with deviations regarding particular time periods. The Neolithisation process in Moravia can be characterized by a relatively constant impact of non-specific stress resulting in displays of dental enamel hypoplasia and in the overall fitness of Neolithic populations. In other words, nutritional conditions and state of health changed in no significant way during the Neolithic period, the population's resistance/adaptation to environmental impacts in connection with socio-economical status showed a similar fitness and physical efficiency, which was probably related as well to reproduction capacity. Compared to the data from medieval populations where the DEH prevalence was much higher, we can assume that the investigated Neolithic populations enjoyed very favourable living conditions, as proved by the ability to cope with later insults of non-specific stressors within these populations. This assumption should be verified by the occurrence of another non-specific stress markers observable on skeletal remains, such as the incidence of *Harris lines* or *cribra orbitalia*.

The environmental impact on abortion rate or vitality of newborns in the Neolithic is only hard to estimate, because the finds of neonatal skeletons are extensively determined by the then funerary customs (for example in the LBK culture many newborns and children used to be buried within settlements – e.g. Žádovice; finds of newborns is not so frequent at cemeteries – e.g. Vedrovice "Široká u lesa"). For this reason we cannot draw any demographic conclusions, because at many sites one couldn't find any representative population samples, which would comprise appropriate sample of both adults and children. Many of these finds are only sporadic. Any closer estimation of morbidity and mortality in connection with non-specific stressors were therefore not performed.

CONCLUSION

This paper was focused on basic dental aspects of the Neolithic population in Moravia, and the aim was to capture the changes that became inscribed into dentitions of Neolithic people. By help of them one can partly reconstruct the living conditions of the then people and compare these results with other series from Central Europe.

The evaluation of dental condition was performed in total 55 subadult and 49 adult individuals with 1976 teeth from Neolithic settlements who were further subdivided by

cultures (LBK, STK, LgK). In these individuals more than a half of teeth (60.4%) and almost 70.5% of dental alveoli were available for analyses.

The individuals of the LBK period, compared to the other Neolithic phases, are characterised by a relatively high dental cariosity (I-CE=13.3; F-CE=42.9), which could indicate an increased consumption of polysaccharides (starch). In the STK period one could detect only a minimum cariosity, which could be due to the small number of examined individuals. At the end of Neolithic, in the LgK period, cariosity was somewhat lower than at the beginning (I-CE=9.8; F-CE=38.5). According to comparative populations from the LBK and Mesolithic periods it can be stated that basing on the caries rates, the populations from Moravian settlements incline to European Mesolithic populations with lower caries rate, rather than to individuals at Vedrovice and Krškany. The caries intensity in the series from Northeast Hungary was higher than that in the populations from Moravian settlements, but comparing the I-CE data in males and females, it reaches similar values. As indicated also by the analysis of dental wear, the composition of food changed during the Neolithisation process from a dense abrasive food in the LBK period to prepared food, which already didn't contained such a high portion of coarse particles, and its consumption didn't cause such a distinctive dental wear. Dental wear reached the highest values within the populations of Vedrovice and Krškany, in the Mesolithic it had been not so remarkable, which partly coincides with data from settlement populations. Both settlement and Mesolithic populations show a higher dental wear in females, whereas the populations of Vedrovice and Krškany in males.

These differences in wear may relate to longer lifespan in the Neolithic than in the Mesolithic, or a grittier diet in the Neolithic resulting in more rapid wear. Current data cannot reject either hypothesis.

In the Moravian Neolithic population the dental enamel hypoplasia was recorded in 14.5% of individuals; in the LBK period in 13.5%, in the STK period in 12.5%, and at the end of Neolithic already in 18.8% of individuals. While the sample is small, this moderate increase in the DEH prevalence may be connected with a slightly increased extent of non-specific stressors (i.e. indicators of metabolic and nutritional disruptions) within the Neolithic period. In populations buried at the cemeteries of Vedrovice and Krškany the occurrence of dental enamel hypoplasia was detected by 18.2%, which is a higher value than that in individuals from LBK settlements, but in no way exceptional in this geographic region. In Northeast Hungary, DEH in teeth was four times lower and in individuals two times lower than in the populations from Moravian settlements. In later medieval populations the DEH prevalence was much higher, which can indicate that the Neolithic people enjoyed very favourable living conditions, as proved by the ability to cope with later insults of non-specific stressors within these populations.

In the Neolithic period teeth had been used probably not only for chewing food, because there is also some unintentional wear arising from extramasticatory activities. The detected high degree of dental wear with accent on the first upper incisors in the LBK period might be connected with the use of teeth as a tool. This type of dental wear occurs probably in relationship with activities involving the processing of fibrous materials, most likely sinew. In the following STK and LgK periods this custom had been probably gradually abandoned, until completely declined. The custom of using teeth as a tool had been probably practiced mainly by females in the oldest Neolithic. In the population from the graveyard at Vedrovice, the use of teeth as a tool could be detected only in adult females, while the manipulative dental wear at Krškany was recorded not only in females, but also in two males and even in children already.

ACKNOWLEDGEMENT

This research was funded by the Czech Science Foundation, grant GAČR No. 206/06/1126, and by the Institutional grant of the Ministry of Culture of the Czech Republic No. 00009486201. We would like to thank to David Frayer and Douglas Ubelaker for their commentaries.

REFERENCES

ANDRIK P., MÜNCNEROVÁ Z., 1961: K výskytu zubného kazu v predhistorických dobách. *Československá stomatologie* 61, 5: 347–353.

BUIKSTRA J. E., UBELAKER D. (Eds.), 1994: *Standards for Data Collection from Human Skeletal Remains. Missouri Archaeological Society*. Proceedings of a Seminar at the Field Museum of Natural History. Arkansas Archeological Survey Research Seminar Series No. 44, Arkansas.

CORRUCCINI R. S., HANDLER J. S., JAKOBI K. P., 1985: Cronological distribution of enamel hypoplasias and weaning in Caribbean slave population. *Hum. Biol.* 57: 699–711.

CRAWFORD W. H., 2002: *Teeth: Dental Caries and Pulp Disease. Oral Pathology*. University of Southern California. 137–156 pp.

ČIŽMÁŘ M., 2006: Neolit. Výzkumy. Ausgrabungen 1999–2004. In: M. Čižmář, K. Geislerová (Eds.): *Výzkumy. Ausgrabungen 1999–2004*. Pp. 13–20. ÚAPP Brno, Brno.

ČIŽMÁŘ M., GEISLEROVÁ K., 2006: Kralice na Hané. In: M. Čižmář, K. Geislerová (Eds.): *Výzkumy. Ausgrabungen 1999–2004*. Pp. 208–209. ÚAPP Brno, Brno.

ČIŽMÁŘ Z., 2000: Seloutky (okr. Prostějov). *Přehled výzkumů* (Brno) 41: 100–101.

ČIŽMÁŘ Z., 2004: Hluboké Mašůvky (okr. Znojmo). *Přehled výzkumů* (Brno) 45: 123–125.

ČIŽMÁŘ Z., DOČKALOVÁ M., 2004: Pohřeb tří jedinců v objektu kultury s lineární keramikou z Hlubokých Mašůvek, okr. Znojmo. In: M. Lutovský (Ed.): *Otázky neolitu a eneolitu našich zemí* 2003. Pp. 354–364. ÚAPP středních Čech, Praha.

ČIŽMÁŘ Z., GEISLEROVÁ K., 1997: Pohřby v jamách na sídlišti kultury s lineární keramikou v Žádovicích, okr. Hodonín. *Pravěk* NŘ 7 (Brno), 1997: 39–64.

ČIŽMÁŘ Z., PŘICHYSTAL M., 2006: Kostrové hroby na sídlišti kultury s lineární keramikou v Modřicích, okr. Brno – venkov. *Pravěk* NŘ 14 (Brno), 2004: 7–37.

DOČKALOVÁ M., 2005: Nálezy neolitických koster z Těšetice (okr. Znojmo). Funde von neolithischen aus Těšetice (Bez. Znojmo). In: I. Cheben, I. Kuzma (Eds.): *Otázky neolitu a eneolitu našich krajín* 2004. Pp. 21–31. Archeologický ústav SAV, Nitra 2005.

DOČKALOVÁ M., 2006: Two skeleton graves from Neolithic settlements in Moravia (Czech Republic). *Anthropologie* XLIV, 2: 127–137.

DOČKALOVÁ M., ČIŽMÁŘ Z., 2007: Neolithic children burials at Moravian settlements in the Czech Republic. *Anthropologie* XLV, 1: 31–59.

DOČKALOVÁ M., ČIŽMÁŘ Z., 2008: Neolithic burials of adult and subadult individuals at Moravian settlements in the Czech Republic. *Anthropologie* XLVI, 1: in print.

DOČKALOVÁ M., KOŠŤUŘÍK P., 1996: Seskupení hrobů nositelů kultury s lineární keramikou na neolitickém sídlišti v Těšeticích–Kyjovicích, okr. Znojmo. *Sborník prací Filosofické fakulty Brněnské University* (Brno) M 1: 5–30.

EL-NAJJAR M. Y., DESANTI M. V., OZEBEK L., 1978: Prevalence and Possible Etiology of Dental Enamel Hypoplasia. *Amer. J. of Phys. Anthrop.* 48: 185–192.

ENSOR B. E., IRISH J. D., 1995: Hypoplastic area Method for Analyzing Dental Enamel Hypoplasia. *Amer. J. of Phys. Anthrop.* 98: 507–517.

FOJTOVÁ M., DOČKALOVÁ M., JAROŠOVÁ I., 2008: Antropologický rozbor koster ze sídlištních pohřbů moravského neolitu. *Ve službách archeologie* 01/08: 213–221.

FRAYER D., 2004: Dental remains from Krškany (Slovakia) and Vedrovice (Czech Republic). *Anthropologie* XLII, 1: 71–103.

FRAYER D. W., MINOZZI S. 2002: Manipulative incisor wear in the LnP sites of Krškany (Slovakia) and Vedrovice (Czech Republic). In: J. Brůžek, B. Vandermeersch, M. D. Garralda (Eds.): *Changements Biologiques et Culturels en Europe de la fin du Paléolithique Moyen au Néolithique*. Pp. 201–211. Laboratoire d'anthropologie des populations du Passé: Bordeaux.

GALBANY J., MARTÍNEZ L.M., PÉREZ-PÉREZ A., 2004: Tooth replication techniques, SEM imaging and microwear analysis in primates: methodological obstacles. *Anthropologie* XLII, 1: 5–12.

GOODMAN A. H., 1993: On the interpretation of health from skeletal remains. *Curr. Anthrop.* 34: 281–288.

GOODMAN A. H., 1998: Variation in time of tooth formation and eruption. In: S. J. Ulijaszek, F. E. Johnston, M. A. Preece (Eds.): *The Cambridge Encyclopedia of Human Growth and Development*. Cambridge University Press, Cambridge.

GOODMAN A. H., ARMELAGOS G. J., 1985: Factors Affecting the Distribution of Enamel Hypoplasias within the Human Permanent Dentition. *Amer. J. of Phys. Anthrop.* 68: 479–493.

GOODMAN A. H., ARMELAGOS G. J., 1989: Infant and childhood morbidity and mortality risks in archaeological populations. *World Archaeology* 21: 225–243.

GOODMAN A. H., ROSE J. C., 1990: Assessment of Systemic Physiological Preturbations from Dental Enamel Hypoplasias and Associated Histological Structures. *Yearbook of Phys. Anthrop.* 33: 59–110.

GOODMAN A. H., PELTO G. H., ALLEN L. H., CHAVEZ A., 1992: Socioeconomic and anthropometric correlates of linear enamel hypoplasia in children from Solis, Mexico. *J. of Paleopathology Monograph Publiblication* 2: 373–380.

HÁJEK Z., 2007: Osada kultury s lineární keramikou a moravskou malovanou keramikou v Chornici. (Settlement of the LBK and MPC culture in Chornice). Unpublished M.A. Thesis. Faculty of Arts, Masaryk University, Brno.

HANÁKOVÁ H., STLOUKAL M., 1966: *Staroslovanské pohřebiště v Josefově. Antropologický rozbor.* Rozpravy Československé akademie věd, řada společenských věd 76, Praha.

HILLSON S., 1979: Diet and dental disease. *World archaeology* 11, 2: 147–162.

HODGES D. C., WILKINSON R. G., 1990: Effect of tooth size on the ageing and chronological distribution of enamel hypoplastic defects. *Amer. J. of Hum. Biol.* 2: 553–560.

HUMPOLA D., 2007: Sídliště kultury s lineární keramikou na k. ú. obce Slatinky. Unpublished Bc. Thesis. Faculty of Arts, Masaryk university, Brno.

JAROŠOVÁ I., 2003: Kazivost a patologické změny chrupu na kosterních pozůstatcích z pohřebiště Znojmo-Hradiště (srovnání středověké a novověké populace). Unpublished thesis. Faculty of Science, Masaryk university, Brno. 162 pp.

JAROŠOVÁ I., 2005: Hypoplasie zubní skloviny jako nespecifický marker stresu u obyvatel ze Znojma-Hradiště (srovnání středověké a novověké populace). *Ve službách archeologie* VI: 379–390.

JAROŠOVÁ I., 2006: Nespecifický stres ve středověké populaci z Dolních Věstonic – Vysoké Zahrady. *Ve službách archeologie* VII: 302–312.

JAROŠOVÁ I., 2007: Paleonutriční studie z odontologických aspektů u staroslovanského obyvatelstva z Dolních Věstonic. Unpublished Ph.D. Dissertation. Faculty of Science, Masaryk university, Brno. 274 pp.

JAROŠOVÁ I., DOČKALOVÁ M., FOJTOVÁ M., 2008a: Vybrané dentální charakteristiky neolitického obyvatelstva ze sídlišť na Moravě – předběžná zpráva. *Ve službách archeologie* 01/08: 222–241.

JAROŠOVÁ I., DOČKALOVÁ M., FOJTOVÁ M., DRESLEROVÁ G., ČIŽMÁŘ Z., HAJNALOVÁ M., 2008b: Rekonstrukce stravy neolitického obyvatelstva z moravských sídlišť podle mikroabrazí zubů. *Sborník Otázky neolitu a neolitu našich krajín* 2007. Nitra, Archeologický ústav SAV Nitra, 2008. s. 1–15. (in print).

JAROŠOVÁ I., PÉREZ-PÉREZ A., DOČKALOVÁ M., DROZDOVÁ E., TURBÓN D., 2006: Buccal dental microwear as a dietary indicator in the Iron Age human population from Son Real, Spain. *Anthropologie* XLIV, 2: 139–150.

KAZDOVÁ E., 1992: K pohřebnímu ritu lidu s vypíchanou keramikou na Moravě. *Sborník prací Filosofické fakulty Brněnské University* (Brno) E 37: 7–24.

KAZDOVÁ E., LORENCOVÁ A., 1985: Společný hrob tří jedinců s vypíchanou keramikou z Těšetic-Kyjovic, okr. Znojmo. *Sborník prací Filosofické fakulty Brněnské University* (Brno) E 30: 7–22.

KILIÁN J. *et al.*, 1999: *Prevence ve stomatologii*. Galén, Univerzita Karlova, Praha.

LALUEZA FOX C., PÉREZ-PÉREZ A., 1993: The diet of the Neanderthal child Gibraltar 2 (Devil's Tower) through the study of the vestibular striation pattern. *J. of Hum. Evol.* 24, 1: 29–41.

LALUEZA C., PÉREZ-PÉREZ A., TURBÓN D., 1993: Microscopic study of the Banyoles mandible (Girona, Spain): Diet, cultural activity and toothpick use. *J. of Hum. Evol.* 24, 4: 281–300.

LARSEN C. S., 1985: Dental Modifications and Tool Use in the Western Great Basin. *Amer. J. of Phys. Anthrop.* 67: 393–402.

LARSEN C. S., 1997: *Bioarchaeology. Interpreting behavior from the human skeleton*. Cambridge University Press, Cambridge. 461 pp.

LILLIE M. C., 1996: Mesolithic and Neolithic Populations of Ukraine: Indicators of Diet From Dental Pathology. *Curr. Anthrop.* 37, 1: 135–142.

LINGSTRÖM P., BORRMAN H., 1999: Distribution of Dental Caries in an Early 17th Century Swedish Population with Special Reference to Diet. *Internat. J. of Osteoarchaeol.* 9: 395–403.

LITTLETON J., 2005: Invisible Impacts but Long-Term Consequences: Hypoplasia and Contact in Central Australia. *Amer. J. of Phys. Anthrop.* 126: 295–304.

LUKACS J. R., 1992: Dental paleopathology and agricultural intensification in south Asia: New evidence from Bronze Age Harappa. *Amer. J. of Phys. Anthrop.* 87: 133–150.

MAIR L. H., 1999: Understanding wear in dentistry. *Compendium* 20: 19–30.

MAIR L. H., STOLARISK T. A., VOWLES R. W., LLOYD C. H., 1996: Wear: Mechanisms, Manifestation and Measurement. *J.of Dentistry* 24: 141–148.

MALVILLE N. J., 1997: Enamel Hypoplasia in Ancestral Puebloan Populations From Southwestern Colorado: I. Permanent Dentition. *Amer. J. of Phys. Anthrop.* 102: 351–367.

MATEICIUCOVÁ I., 2008: *Talking stones: the chipped stone industry in Lower Austria and Moravia and the beginnings of the Neolithic in Central Europe (LBK), 5700–4900 BC*. Disertationes Archaeologicae Brunenses/Pragensesque 4, Brno-Praha.

MINOZZI S., 1994: Il contributo della microusura dentaria nella ricerce antropologica: metodologia, techniche e differenti applicazioni. Tesi de dottorato in scienze antropologiche, Pisa.

MOLNAR S., 1972: Tooth Wear and Culture. *Curr. Anthrop.* 13: 511–525.

MOORE W. J., CORBETT M. E., 1971: The Distribution of Dental Caries in Ancienit British Populations 1: Anglo-Saxon period. *Caries Research* 5: 151–168.

OBERTOVÁ Z., 2005: Environmental stress in the Early Mediaeval Slavic population at Borovce (Slovakia). *Homo – J. of Comparative Human Biology* 55: 283–291.

OLIVA M., 2005: Výzkum pravěké těžby rohovce v Krumlovském lese. *Acta Musei Moravice – Časopis Moravského muzea, Sci. Soc.* 90: 161–183.

ONDRUŠ V., 1972: Dětské pohřby na neolitickém sídlišti ve Vedrovicích. *Časopis Moravského muzea* LVII: 27–36.

ONDRUŠ V., 1976: Vedrovice (okr. Znojmo), neolitické sídliště. *Vlastivědný věstník Moravský* XXVIII, 3: 316.

PAVÚK J., 1972: Neolithisches Gräberfeld in Nitra. *Slovenská archeológia* 20: 5–105.

PODBORSKÝ V., 1969: Neolitické sídliště u Těšetic-Kyjovic na Moravě. *Památky archeologické* LX, 2: 572–592.

PODBORSKÝ V., 1973–1974: Šest let terénního archeologického výzkumu neolitického a halštatského sídliště v "Sutnách" u Těšetic-Kyjovic. *Sborník prací Filosofické fakulty Brněnské University* (Brno) E 18-19: 5–33.

PODBORSKÝ V., 1975–1976: Hlavní výsledky v Těšeticích-Kyjovicích za léta 1964 až 1974. *Sborník prací Filosofické fakulty Brněnské University* (Brno) E 20-21: 175–184.

PODBORSKÝ V., 1988: *Těšetice – Kyjovice 4. Rondel osady lidu s moravskou malovanou keramikou.* Univerzita J. E. Purkyně, Brno. 311 pp.

PODBORSKÝ V., *et al.*, 1993: *Pravěké dějiny Moravy*. Muzejní a vlastivědná společnost v Brně, Brno. Nová řada 3. 543 pp.

PODBORSKÝ V., *et al.*, 2002: *Dvě pohřebiště neolitického lidu s lineární keramikou ve Vedrovicích na Moravě.* Filozofická fakulta Masarykovy Univerzity v Brně, Brno. 343 pp.

PŘICHYSTAL M., 2006: Brno (k. ú. Starý Lískovec, okr. Brno – město). *Přehled výzkumů* (Brno) 47: 102–103.

PŘICHYSTAL M., 2008: Brno (k. ú. Bohunice, Nový a Starý Lískovec, okr. Brno-město). In: Z. Čižmář (Ed.): *Život a smrt v mladší době kamenné. Katalog výstavy*. Pp. 50–59, 168–169, 287–290. Ústav archeologické památkové péče Brno, Brno-Znojmo.

SANTOS R. V., COIMBRA C. E. A., 1999: Hardships of Contact: Enamel Hypoplasias in Tupí-Mondé Amerindians from the Brazilian Amazonia. *Amer. J. of Phys. Anthrop.* 109: 111–127.

SARNAT B. G., SCHOUR I.,1941: Enamel hypoplasia (chronologic enamel aplasia) in relation to systemic disease: A chronologic, morphologic and etiologic classification. *J. of American Dental Association* 28: 1989–2000.

SAUNDERS S. R., DEVITO C., KARZENBERG M. A., 1997: Dental Caries in Nineteenth Century Upper Canada. *Amer. J. of Phys. Anthrop.* 104: 71–87.

SCHULZ P., 1977: Task Activity and Anterior Tooth Grooving in Prehistoric California Indians. *Amer. J. of Phys. Anthrop.* 46: 87–92.

SCOTT E., 1979: Dental wear scoring technique. *Amer. J. of Phys. Anthrop.* 51: 213–217.

SMITH B. H., 1984: Patterns of Molar Wear in Hunter-Gatherers and Agriculturists. *Amer. J. of Phys. Anthrop.* 63: 39–56.

STLOUKAL M., 1963: Gesundheitszustand des Gebisses bei der Population von grossmährischen Mikulčice. *Anthropologie* III: 35–45.

ŠMÍD M., 2003: Slatinky (okr. Prostějov). *Přehled výzkumů* 44: 211–212.

ŠMÍD M., 2004: Kralice na Hané (okr. Prostějov). *Přehled výzkumů* 45: 169–170.

ŠMÍD M., 2006: Kralice na Hané (okr. Prostějov). *Přehled výzkumů* 47: 106–107

TRAMPOTA F., 2008: Lengyelské osídlení Střelické kotliny na Brněnsku. Unpublished M.A. Thesis. Faculty of Arts, Masaryk university, Brno.

UBELAKER D. H., PAP I., GRAVER S. (2006): Morbidity and Mortality in the Neolithic of Northeastern Hungary. Anthropologie XLIV, 3: 241–257

VOREL F. *et al.*, 1999: *Soudní lékařství*. Grada Publishing, Praha.

WRIGHT L. E., 1997: Intertooth Patterns of Hypoplasia Expression: Implications for Childhood Health in the Classic Maya Collapse. *Amer. J. of Phys. Anthrop.* 102: 233–247.

WOTKE J., 2001: *Patologie orofaciální oblasti*. Avicenum, Grada Publishing, Praha.

Ivana Jarošová
Marta Dočkalová
Anthropos Institute
Moravian Museum
Zelný trh 6
659 37 Brno, Czech Republic
e-mail: ijarosova@mzm.cz
mdockalova@mzm.cz

APPENDIX 1. List of sites and individuals examined for the Neolithic dental analysis (n=104).

Site	Burial No.	Culture	Sex	Age
Brno-Komín	Pa44/38	LgK	M	20–25 yrs
Brno-Komín, Nivy	H800/2006	LBK?	F	12 yrs
Brno-Starý Lískovec	Pit 658/cont. 410/800/2005	LBK	child	4–5 m
Brno-Starý Lískovec	Pit 534/K800/2006	LBK	child	6 m
Brno-Starý Lískovec	Pit 2601/K801/2006	LBK	?	45–55 yrs
Brno-Bohunice/Starý Lískovec	Pit 2565/K800/2007	LBK	M?	40–60 yrs
Brno-Bohunice/Starý Lískovec	Pit 4689/K801/2007	LBK	child	9 yrs
Brno-Starý Lískovec	Pit 5575/K802/2007	LBK	child	inf I (2–4 m)
Brno-Starý Lískovec	K803/2007	LBK	M	20–21 yrs
Brno-Starý Lískovec	K805/Pit 7714/2008	LBK	M	15–19 yrs
Brno-Starý Lískovec	K806/Pit 7727/2008	LBK	M	50–60 yrs
Držovice	H2/1998	LBK	F	25–30 yrs
Hluboké Mašůvky	Pit 654/H1/2003	LBK	F	25–30 yrs
Hluboké Mašůvky	Pit 654/H2/2003	LBK	F	18–20 yrs
Hluboké Mašůvky	Pit 654/H3/2003	LBK	child	5 yrs
Hluboké Mašůvky-Panská cihelna	Inv.No. 17,1897	LgK	?	20–29 yrs
Hnanice I, Znojmo dist.	Pit 3/1992	LgK	F	20–25 yrs
Holubice	Inv.No. 10	LgK	?	19–20 yrs
Chornice	H1	LBK	M	35–40 yrs
Kralice na Hané	Pit 548/2003	LBK	child	1 yr (±4 m)
Kralice na Hané	K1683/2003	LBK	?	18–21 yrs
Krumlovský les	KH1/2002	LgK	F	25–35 yrs
Krumlovský les	KH2a/2002	LgK	F	35–40 yrs
Kuřim	Pit243/1996	LBK	?	20–29 yrs
Mašovice-Pšeničné, near Znojmo	H1/K1066/41/2003	LgK	M	20–29 yrs
Mašovice-Pšeničné, near Znojmo	H2/2003	LBK	F	15–17 yrs
Modřice	Pit 551/H800/2004	LBK	F	50–55 yrs
Modřice	Pit 734/H801/2004	LBK	F	50–55 yrs
Modřice	Pit 796/H802/2004	LBK	child	newborn
Moravský Krumlov	1/80	LgK	F	25–30 yrs
Moravský Krumlov	pit 513_2002	LBK	child	9 yrs
Nová Ves u Oslavan	Inv.No. 1/16/1950	STK	?	25–30 yrs
Olšany	K506/H1/2001	LBK	?	30–39 yrs
Opava	Inv.No. IV/1612	LBK	F	20–25 yrs
Pohořelice-Šumice	Inv.No. IV/1611/1959	LBK	?	20–25 yrs
Prostějov-Čechůvky	K1535/2004	LgK	F	14–15 yrs
Dolní Újezd-Dluhonice (Předmostí)	Pit 126/H1/2006	LgK	F	40–45 yrs
Rybníky	Inv.No. 35/1939	STK	F	30–35 yrs
Seloutky	K527-H1/1999	LBK	child	3 yrs
Slatinky, Močílky	H1/2002	LBK	child	10–11 yrs
Slatinky, Močílky	H2/2002	LBK	child	6–9 m
Střelice, Znojmo dist.	H I, Inv.No. 12	LgK	F	60+ yrs
Střelice, Znojmo dist.	9/Inv.No. 15	LgK	?	30–40 yrs
Střelice, Znojmo dist.	16	LgK	child	5 yrs
Střelice, Brno dist.	Pit 523/K800/2005	LgK	?	16 yrs
Těšetice-Kyjovice	KH11/1986	LBK	F	45–55 yrs
Těšetice-Kyjovice	KH14/1988	LBK*	F	20–25 yrs
Těšetice-Kyjovice	KH15/1991	LBK	child	11 yrs
Těšetice-Kyjovice	KH17/1991	LBK	child	9–10 yrs
Těšetice-Kyjovice	KH18/1992	LBK	F	20–25 yrs
Těšetice-Kyjovice	KH19/1992	LBK	M	16–18 yrs
Těšetice-Kyjovice	KH20/1992	LBK	M	17–19 yrs
Těšetice-Kyjovice	KH21/1992	LBK	M	20–22 yrs
Těšetice-Kyjovice	KH22/1993	LBK	child	4 yrs

APPENDIX 1. List of sites and individuals examined for the Neolithic dental analysis (n=104) (*continue*).

Site	Burial No.	Culture	Sex	Age
Těšetice-Kyjovice	KH23/1993	LBK	child	4 yrs
Těšetice-Kyjovice	KH26/2005	LBK	child	0–1 m
Těšetice-Kyjovice	KH2_1/1968	STK	M	40–45 yrs
Těšetice-Kyjovice	KH2_2/1968	STK	?	35–45 yrs
Těšetice-Kyjovice	H10/1/1981	STK	M	30–35 yrs
Těšetice-Kyjovice	H10/2/1981	STK	F	45–55 yrs
Těšetice-Kyjovice	H10/3/1981	STK	child	7 yrs
Těšetice-Kyjovice	H 13/1989	STK	?	20–25 yrs
Těšetice-Kyjovice	KH1/1967	LgK	child	2 yrs
Těšetice-Kyjovice	KH3/1972	LgK	M	24–30 yrs
Těšetice-Kyjovice	KH4/1974	LgK	M	20–24 yrs
Těšetice-Kyjovice	KH6/1967	LgK	child	5–6 yrs
Těšetice-Kyjovice	KH8/1976	LgK	F	20–25 yrs
Trstěnice	Inv.No. 36/1957	STK	F	35–40 yrs
Vedrovice, Široká u lesa (settlement)	I/1963	LBK	child	6–9 m
Vedrovice, Široká u lesa (settlement)	II/1963	LBK	child	5 yrs
Vedrovice, Široká u lesa (settlement)	H3/1966	LBK	child	9 yrs
Vedrovice, Široká u lesa (settlement)	H4/1969	LBK	child	8 yrs
Vedrovice, Široká u lesa (settlement)	5/1971	LBK	child	6–7 yrs
Vedrovice, Široká u lesa (settlement)	6/1972	LBK	child	3 yrs
Vedrovice, Široká u lesa (settlement)	7/1972	LBK	child	newborn
Vedrovice, Široká u lesa (settlement)	9/1974	LBK	F	50–59 yrs
Vedrovice, Široká u lesa (settlement)	10/1974	LBK	M	40–49 yrs
Vedrovice, Široká u lesa (settlement)	11/1974	LBK	M	45–55 yrs
Vedrovice, Široká u lesa (settlement)	109/1984	LgK	child	4–5 yrs
Vedrovice, Za dvorem (Pit 37)	H1/1985	LBK	F	20–25 yrs
Vedrovice, Za dvorem (graveyard)	H2/1985	LBK	M	25–30 yrs
Vedrovice, Za dvorem (Pit 56)	H3/1986	LBK	child	1,5–2 yrs
Vedrovice, Za dvorem (graveyard)	H5/1988	LBK	child	3 yrs
Vedrovice, Za dvorem (graveyard)	H6/1988	LBK	F	50+ yrs
Vedrovice, Za dvorem (graveyard)	H7/1988	LBK	F	35–45 yrs
Vedrovice, Za dvorem (graveyard)	H8/1988	LBK	child	13–15 yrs
Vedrovice, Za dvorem (graveyard)	H9/1988	LBK	F?	18 yrs
Vedrovice, Za dvorem (graveyard)	H10/1989	LBK	F	20–25 yrs
Vedrovice, Za dvorem (settlement)	H11/1997	LBK	F	50+ yrs
Vedrovice, Za dvorem (settlement)	H12/1996	LBK	child	4 yrs
Vedrovice, Za dvorem (settlement)	H13/1997	LBK	child	2 yrs
Velatice, Velký Široký	Pit 725/K800/2006	LBK	child	2 yrs
Vyškov	H37/1960	STK	?	15 yrs
Žádovice, Hodonín dist.	Pit 52-H1/1986	LBK	child	5–6 yrs
Žádovice, Hodonín dist.	Pit 52-H2/1986	LBK	child	8 yrs
Žádovice, Hodonín dist.	Pit 52-H3/1986	LBK	child	1 yr
Žádovice, Hodonín dist.	Pit 82-H1/1986	LBK	child	7 yrs
Žádovice, Hodonín dist.	Pit 82-H2/1986	LBK	child	2 yrs
Žádovice, Hodonín dist.	Pit 95-H237	LgK *	child	8 yrs
Žádovice, Hodonín dist.	Pit 95	LBK	child	newborn
Žádovice, Hodonín dist.	Pit 109/1986	LBK	?	35–45 yrs
Žádovice, Hodonín dist.	Pit 142-H1/1986	LBK	child	4 yrs
Žádovice, Hodonín dist.	Pit 141-H2/1986	LBK	child	6 yrs
Želešice u Brna	I/1979	LBK	F	25–30 yrs

* newly dated individuals (note: the individuals buried at the site of Vedrovice, Za dvorem were analysed completely, regardless of whether being buried inside the settlement or graveyard; the female from burial 25/2001 at Těšetice-Kyjovice, which had been classified to LBK by older research, was excluded because of being newly dated as late as to the Eneolithic).