Časopis Národního muzea, Řada přírodovědná
(Journal of the National Museum, Natural History Series)
Vol. 175 (1–2): 31–37, 2006

Holocene human remains from the Dzeravá skala Cave, West Slovakia

Alena Šefčáková[1] and Milan Thurzo[2]

[1]Department of Anthropology, Slovak National Museum, Vajanského nábrežie 2, P.O. Box 13, SK-810 06 Bratislava 16, Slovakia, e-mail: sefcakova@snm.sk
[2]Department of Anthropology, Faculty of Natural Sciences, Comenius University, Mlynská dolina, SK-842 15 Bratislava, Slovakia; e-mail: milan.thurzo@fns.uniba.sk

Abstract. On three different occasions, some human remains were found in the Dzeravá skala cave (Pálffybarlang), situated in the Mokrá dolina Valley, Malé Karpaty Mountains (Plavecký Mikuláš Co.). Archaeological record comprises the Eneolithic, Neolithic, Early Upper Paleolithic, and the Late Middle Paleolithic. The earliest find, from 1913, is a crown of the lower right second permanent molar of a child, who died at the age of 6–7 years; the tooth is dated to the Late Paleolithic. A child's skeleton and one isolated tooth represent the other two more recent anthropological finds dated to the Early Eneolithic. The child, unearthed during the archaeological excavation of F. Prošek in the Dzeravá skala cave in 1950, died at the age of ca 12 months. The skeleton was deposited flexed on its left side. There are no pathological changes or stress markings caused by ecological factors. In 2002, a permanent second upper incisor of a 7- to 11-years-old individual was found. The tooth shows neither traces of transport, nor changes caused by heat. From the point of view of its health state, there are no marks of any environmental stresses or pathological changes (e. g. hypoplasia).

■ **Human skeletons, teeth, children, osteoskopy, osteometrics, Paleolithic, Early Eneolithic, Middle Europe**

INTRODUCTION

Dzeravá skala cave (Pálffybarlang), situated in the Mokrá dolina Valley, Malé Karpaty Mountains (Plavecký Mikuláš Co.), is a well-known archaeological, anthropological and paleontological site in Western Slovakia; the archaeological record comprises the Neolithic, Early Upper Paleolithic, and the Late Middle Paleolithic.

The site is located in a short but deep-cut karstic valley on the western slopes of these mountains, facing the Morava River plain. The cave entrance is 18 m wide, 22 m long and 10 m high. It is located 450 m a.s.l., 37 m above the valley floor, and faces to the east (Kaminská et al. 2004).

The cave was excavated during several field seasons (Hillebrand 1914, Horálek 1931, Prošek 1951a,b, 1953, Bárta 1969, Alsworth-Jones 1986), the last excavations were carried out in 2002–2003 (Farkaš et al. 2003, Kaminská et al. 2004, Farkaš & Oždáni 2005) and 2005 (Farkaš 2006).

During three different occasions, also some human remains were found in the Dzeravá skala cave. The earliest one, found in 1913, is a crown of the lower right second permanent molar of a child, who died at the age of 6–7 years; this tooth is dated to the Late Paleolithic, in particular to the Protosolutréen (Hillebrand 1914). Recently, the specimen was deposited at the Department of Anthropology of the Hungarian Natural History Museum, Budapest.

A child's skeleton and one isolated tooth represent the other two more recent anthropological finds. The child's skeleton excavated in 1950 is related to the late Lengyel Culture (so-called Ludanice Group, categorized sometimes with the Epilengyel Culture), the human tooth (found in 2002) is dated according to the archaeological context to the Early Eneolithic Age.

THE ENEOLITHIC HUMAN SKELETON FROM 1950

Conditions of the discovery. During an archaeological excavation carried out between March and May 1950 by F. Prošek (1950, 1951a,b), a grave with a child's skeleton buried in flexed position and covered by a flat millstone was found. In the earthwork covering the grave, a little fragment of copper was deposited. Under the layer of artefacts dated to the Neolithic Age and estimated by F. Prošek to be 4000-years-old (recently its age has been estimated to be older than 5500 B.C.), there was a white calciferous layer without any findings (Prošek 1951a,b). This grave was relatively intimately described by Vlček (1950), but it has never been fully documented and skeletal remains have not been preserved till now.

The partly damaged child's grave, with a skeleton partly collapsed into older pole pits, was found among the remains of a settlement object in a layer containing artefacts of Lengyel Culture. Undoubtedly, it is a child's skeleton and as such it proves that the funeral rite practised by people of this culture was applied to children, too (Vlček 1950).
Burial rite. The child's skeleton was deposited in a shallow hollow (40 cm long, 20 cm wide) that was surrounded by irregularly hollowed pole pits. Some of them were under the skeleton and in its immediate surroundings together with some boulders.

The individual was buried strongly flexed on the left side, while the exact position of the face cannot be reconstructed. Remains of its fragmented skull were mostly sunk in one of the stick pits. The vertebral column had a shape of a fluent curve with the convexity facing outside. The costal remains were still in an articulated position. The right arm was slightly stretched backward, so the elbow protruded behind the spinal column. Strongly bent and somehow dislocated legs were disarticulated in the knee joints. Except for the isolated ossification centers (e. g. in calcaneus), the bones of hands and feet were not preserved.
State of preservation. From the skull, only fragments of the braincase were preserved. Following a partial reconstruction, it is evident that the braincase is very small and slightly deformed postmortem. The large and small fontanels are clearly visible and they are relatively big. From the face, only the left-sided mandibular condyle has been found. The axial skeleton is represented by isolated vertebral bodies, arcs and their fragments, as well as by well preserved ribs. The limb bones consist of complete diaphyses and some isolated epiphyseal ossification centers. The following bones remained: both clavicles, left scapula, both humeri, both radii, one ulna, right os ilium, right os ischium, both pubic bones, both femora, both tibiae, one fibula, one calcaneus, metacarpal bones, manual phalanges, metatarsal bones, and pedal phalanges.
Age estimation. The age of this little child could not be precisely estimated because of absence of the face bones, especially jaws. Vlček (1950) estimated the child's stature (Table 1) according to the diaphyses length to 60 – 65 cm, what corresponds with the age of 6–10 months using the Toldt scale. When using the newer age scale by Stloukal and Hanáková (1978), the age estimation increases to ca 12 month (Table 1).

Table 1. Age estimation of the child's skeletal remains from Dzeravá skala according to the long bone diaphyses length (data from Vlček 1950).

Bone	Length (mm)		Stature (cm)	Age (months) by Toldt method (Vlček 1950)	Age (months) (Stloukal a Hanáková 1978)
	right	left			
Clavicula	58	58	60	6	–
Humerus	93	92	60–65	6–10	12
Radius	70	70	60–65	6–10	6
Ulna	80	–	60–65	6–10	12
Femur	118	118	60–65	6–10	12
Tibia	95	95	60–65	6–10	12

The child's bones are well formed, there are no symptoms of any vitamin or mineral deficiencies – it could be supposed that the nutrition was adequate.

Conclusions. In a skeletal grave unearthed during the archaeological excavation of F. Prošek in the cave Dzeravá skala in 1950, localized in a layer encompassing the artifacts of Lengyel Culture, was buried a child that died at the age of ca 12 month (age category infans I). The skeleton was deposited flexed on its left side. There are no pathological changes or stress markings caused by ecological factors.

THE ENEOLITHIC HUMAN TOOTH FROM 2002

Stratigraphic position. Dz – PP; se E 10/132; layer 1b/pit 2; depth: 15 / 20 cm.

Material and methods. A human tooth (Fig. 1), found on July 16, 2002 during an archaeological excavation in the cave Dzeravá skala located in the Mokrá dolina Valley, Malé Karpaty Mountains (dept. Plavecký Mikuláš), is analysed.

The tooth is investigated by means of morphoscopic (Dokládal 1994, Buikstra and Ubelaker 1994, Hillson 1996), as well as by morphometric (Bräuer 1988) methods.

We tried to estimate the age of the owner by the degree of root canal obliteration using developmental data by Moorees et al. (1963a, 1963b) combined with the diagram of Ubelaker (Buikstra & Ubelaker 1994).

Morphoscopic analysis. The specimen is a one-rooted permanent tooth without caries having a spatulate crown and sharp incisal edge showing some lingual attrition. On the incisal edge there are two marginal tubercles.

The labial surface is vertically (longitudinally) and horizontally (transversally) slightly convex. The transversal arch is more pronounced and in a mesial to distal direction magnified, so a mesiolabial bulge originates. The shallower longitudinal arch is most pronounced in the cervical third of the labial face. Two shallow depressions run down from the incisal edge on the labial face. There are no evident hypoplastic changes on the crown.

The palatinal surface is concave. Its sides are distinctly marked by two marginal ridges, which converge into the tuberculum at the cement-enamel junction. Since the distal and mesial ridges enclose a shallow depression in the middle of this surface, the tooth reveals a shoveling of the 2nd degree (easily seen elevations) according to Scott (Buikstra & Ubelaker 1994). The blind foramen caecum is present at the lower margin of tuberculum dentis.

Both approximal (lateral) crown surfaces have a triangular shape. The crown is separated from the root by the cingulum bulge. One inconspicuous, shallow groove runs

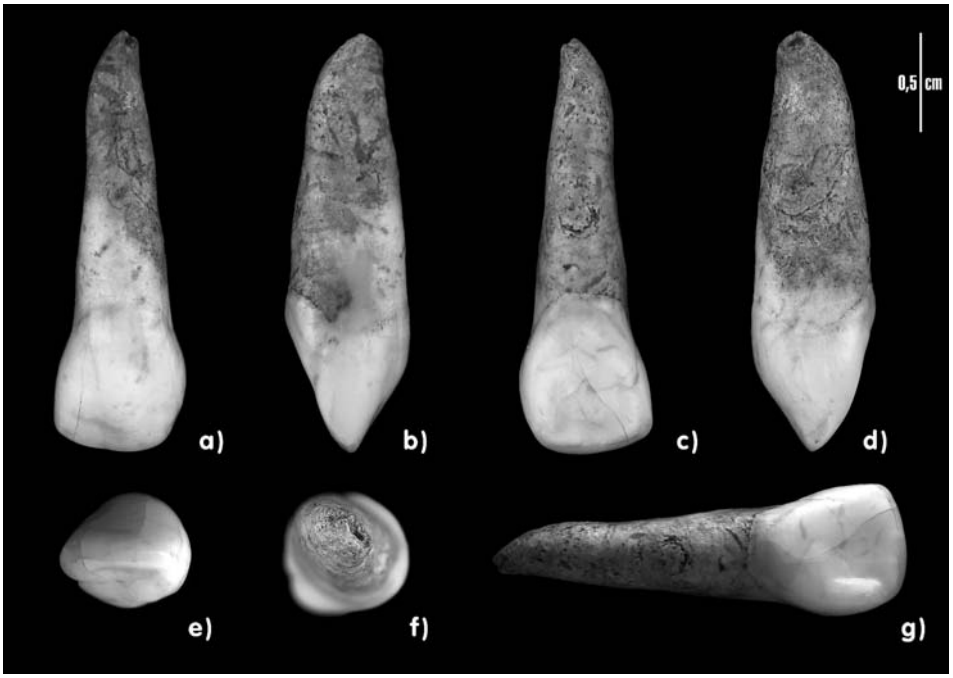

Fig. 1: An Eneolitithic tooth from Dzeravej skala cave (Mokrá dolina, Plavecký Mikuláš Co.): (a) labial view, (b) mesial view, (c) palatinal view, (d) distal view, (e) incisal view, (f) apical view, (g) palatinal view with the accentuated shoveling. Photo by Andy Bezák.

on the mesial surface from around the middle of the mesial ridge to the middle of the cingulum.

The cross-section of the cervix is elliptic; in the labial surface it is a little broader than in the palatinal.

Substantially, the root is even, slim, conical, and slightly flattened from the sides. It diverges distally and palatinally from the axis of the crown. The root surface is furrowed by shallow horizontal grooves. Its apex is slightly bent distally.

The crown is not abraded but the incisal edge shows weak attrition. About half of the apical foramen is still open.

The tooth shows no traces of transport, there are no changes caused by heat on the tooth, thus it was not burned.

Metrical data. Tooth dimensions (after Bräuer 1988; in mm) are as follows: mesio-distal crown diameter (81, MD) = 6.57, mesio-distal crown diameter on the enamel boundary (*81a) = 4.86, middle length of occlusal surface (*81b) = 6.43, bucco-lingual crown diameter (81(1), BL) = 6.20, bucco-lingual crown diameter on the enamel boundary (*81d) = 6.06, crown height (81(2)) = 6.50, labial length of incisor crown (*91) = 7.84, lingual length of incisor crown (*91a) = 8.82, anterior height of incisors (*91b) = 5.44, posterior height of incisors (*91c) = 5.82, length of incisor incisal edge (*91d) = 5.55, outer root length (*93) = 14.28, inner root length (*93a) = 14.36, projection root length (*93b) = 14.00, maximum longitudinal root diameter (*93c) = 13.21, maximum transversal root diameter (*93d) = 5.63, maximum dental height = 20.80 mm.

Dental indices (after Hillson 1996) are as follows: crown module ((MD diam. + BL diam. /2)) = 6.385, Crown index ((100xBL diam.)/MD diam.) = 94.368, robustness index (crown area) (MD diam. x BL diam.) = 40.734.

Results and discussion. As the tooth morphology suggests, the specimen is a permanent upper left incisor (^{2}I) with incomplete root formation (Fig. 1). While the longitudinal growth of the root is completed, about a half of its apical foramen is still open. This state corresponds to the 13th degree according to Moorees et al. (1963b), respectively the G-phase according to Demirjian, Goldstein and Tanner (Kahl & Schwarze 1988). According to Škaloud (1975), who based his conclusions on the X-rays of the second incisors taken from 52 children, the roots of these teeth close totally in the recent population at the age of 10.4–11.5 years. Fundamentally, this is consistent with Hillson (1996) who gives the range, specified by Shour and Massler for the upper second incisors in 1940, to 10.0–11.0 years. For the G-phase of closing the second incisor roots, Kahl and Schwarze (1988) ascertained the mean age of 10.4 years (10.2 years as median) in girls, 11.0 years (10.8 years as median) in boys. On the basis of the Ubelaker's diagram (Buikstra & Ubelaker 1994), the tooth analysed could come from an infant individual that died at the age of 9 years ± 24 month (age category infans II).

Because of the absence of a reference population, we could not try to estimate the age of the individual according to the regression equations, as suggested e. g. by Liversidge et al. (1998).

The sex estimation according to the teeth dimensions is not reliable enough, particularly in the case (as in this situation) when the metrical data of both the larger local population and the same period are unknown, and especially sex estimation concerning at least some individuals could not be carried out using reliable pelvic indicators (Hillson 1996). However, this information also does not assure total success (Kieser & Groeneveld 1989). Intersexual differences among the measurements of individual teeth are too small (ca 0.4–0.5 mm), so here the measurement errors are of importance. In addition, the second upper incisors, together with the third molars, belong to the most variable teeth (Hillson 1996). In addition to the intersexual differences, crown dimensions of the permanent teeth could be influenced not only by intrauterine development but also by variable environmental factors (Harila-Kaera et al. 2001). Despite the fact that most of the authors suppose that the tooth after formation does not continuously change its shape (e.g. Schnutenhaus & Rösing 1998), the principle of the constancy of crown dimensions of permanent teeth during the life of an individual couldn't be valid (Molleson & Cruse 1998).

Conclusion. In 2002, during an archaeological excavation in the cave Dzeravá skala, a permanent second upper incisor (^{2}I) of a 7- to 11-years-old individual (age category infans II) was found. The specimen resided in a layer corresponding to the Eneolithic Period. The tooth shows neither traces of transport, nor changes caused by heat. From the point of view of its health state, there are no marks of any environmental stresses or pathological changes (e. g. hypoplasia).

ACKNOWLEDGMENTS

This contribution was partly funded by the grant VEGA 1/1288/04 (Slovak Republic).

LITERATURE

Alsworth-Jones P., 1986: The Szeletian and the transition from Middle to Upper Paleolithic in Central Europe. Oxford: Oxford University Press, pp. 120-123.

Bárta J., 1969: Osídlenie slovenských jaskýň v staršej dobe kamennej [Occupation of Slovak caves in the early Paleolithic]. – Nové Obzory 11: 201-224. [In Slovak.]

Bräuer, G. (1988): Osteometrie. – In: Knussmann R. (ed.): Anthropologie. Vol. 1: 160-232. Stuttgart: Gustav Fischer Verlag.

Buikstra J. & Ubelaker D.H., eds., 1994: Standards for data collection from human skeletal remains. Fayetteville, Arkansas: Arkansas Archaeological Survey, 205 pp.

Dokládal M., 1994: Anatomie zubů a chrupu [The anatomy of teeth and dentition]. Brno: Vydavatelství Masarykovy Univerzity, 121 pp. [In Czech.]

Farkaš Z., 2006: Archeologický výskum v jaskyni Dzeravá skala pri Plaveckom Mikuláši v roku 2005 [Archeological exploration in Dzeravá skala Cave near Plavecký Mikuláš in 2005]. – AVANS z roku 2005 (submitted). [In Slovak.]

Farkaš Z. & Ožďáni D., 2005: Postpaleoplitické osídlenie jaskyne Dzeravá skala pri Plaveckom Mikuláši [Post-Paleolithic occupation of Dzeravá skala Cave near Plavecký Mikuláš]. – In: Kuzma I. & Cheben K. (eds.): Otázky neolitu a eneolitu našich krajín – 2004 [Problems of the Neolithic and Eneolithic in our countries – 2004]: 49-90. Nitra: Archeologický ústav SAV.

Farkaš Z., Kaminská Ľ., Kozlowski J.K. & Svoboda J.A., 2003: Prvé výsledky revízneho výskumu v jaskyni Dzeravá skala [First results of a revision exploration in Dzeravá skala cave]. – Archeologické výskumy a nálezy na Slovensku 2002: 36-38, 173-174.

Harila-Kaera V., Heikkinen T. & Alvesalo L., 2001: Permanent tooth crown dimensions in prematurely born children. – Early Human Development 62: 131-147.

Hillebrand E., 1914: Ergebnisse meiner Höhlenforschungen im Jahre 1913 – Az 1913. evi barlangkutatásaim eredményei. – Barlangkutatas 2: 115-124, 147-153. [In German and Hungarian.]

Hillson S., 1996: Dental Anthropology. Cambridge: Cambridge University Press, 373 pp.

Horálek F., 1931: Archeologický výzkum v jeskyni Pálffyově u Plaveckého Svatého Mikuláše [Archaeological exploration in Pálffy Cave near Plavecký Svatý Mikuláš]. – In: Eisner J., Hofman J. & Pražák V. (eds.): Príspevky k praveku, dejinám a národopisu Slovenska (Sborník Archeologického a Národopisného Odboru Slovenského Vlastivedného Múzea za Rok 1924–1931): 12-16. Bratislava: Spoločnosť Slovenského vlastivedného múzea.

Kahl B. & Schwartze C.W., 1988: Aktualisierung der Dentitionstabelle von I. Schour und M. Massler von 1941. – Fortschritte der Kieferorthopädie 49: 432-443.

Kaminská Ľ., Kozłowski J.K. & Svoboda J.A., 2004: The 2002-2003 excavation in the Dzeravá skala Cave, West Slovakia. – Anthropologie 42: 311-322.

Kieser J.A. & Groeneveld H.T., 1989: The unreliability of sex allocation based on human odontometric data. – Journal of Forensic Odonto-Stomatology 71: 1-12.

Liversidge H.M., Herdeg B. & Rösing F.W., 1998: Dental age estimation of non-adults. A review of methods and principles. – In: Alt K.W., Rösing F.W. & Teschler-Nicola M. (eds.): Dental anthropology: Fundmentals, limits, and prospects: 419-442. Wien: Springer.

Molleson T. & Cruse K., 1998: Some sexually dimorphic features of the human juvenile skull and their value in sex determination in immature skeletal remains. – Journal of Archaeological Science 25: 719-728.

Moorees C.F.A., Fanning E.A. & Hunt E.E., 1963a: Formation and resorbtion of three deciduous teeth in children. – American Journal of Physical Anthropology 21: 205-213.

Moorees C.F.A., Fanning E.A. & Hunt E.E., 1963b: Age variation of formation stages for ten permanent teeth. – Journal of Dental Research 42: 1490-1502.

Prošek F., 1950: Zpráva o výzkumu jeskyně Dzeravé skály v Malých Karpatech, obec Plavecký Svatý Mikuláš, okres Malacky r. 1950 [A report on the exploration of Dzeravá skála Cave in Malé Karpaty Mountains, Plavecký Svatý Mikuláš village, Malacky County, in 1950]. – Unpublished report (k.č. 1043/1950), Archeological Institute, Slovak Academy of Sciences, Nitra, 3 pp. [In Czech.]

Prošek F., 1951a: Výzkum jeskyně Dzeravé skaly v Malých Karpatech [Exploration of Dzeravá skala Cave in Malé Karpaty Mountains]. – Archeologické Rozhledy 3: 293-298. [In Czech.]

Prošek F., 1951b: Archeologický výskum jaskyne „Dzeravá skala“ [Archaeological exploration of “Dzeravá skala” Cave]. – Krásy Slovenska 28: 62-66. [In Slovak.]

Prošek F., 1953: Szeletién na Slovensku [Szeletian in Slovakia]. – Slovenská Archeológia 1: 133-194. [In Czech.]

Schnutenhaus S. & Rösing F.W., 1998: World variation of tooth size. – In: Alt K.W., Rösing F.W. & Teschler-Nicola M. (eds.): Dental anthropology: Fundmentals, limits, and prospects: 521-535. Wien: Springer.

Škaloud F., 1975: Time of closing of root apices of permanent teeth. – In: Vlček E. & Dokládal M. (eds): Symposium on dental age determination on osteological material (on May 23th 1973, June 13th 1973 and February 19th 1974). – Scripta Medica 48: 195-196.

Stloukal M. & Hanáková H., 1978: Die Länge der Längsknochen altslawischer Bevölkerung unter besonderer Berücksichtigung von Wachstumsfragen. – Homo 26: 53-69.

Vlček E., 1950: Lengyelský kostrový hrob z Dzeravej skály [A Lengyel grave from Dzeravá skála]. – In: Prošek F. (ed.): Zpráva o výzkumu jeskyně Dzeravé skály v Malých Karpatech, obec Plavecký Svatý Mikuláš, okres Malacky r. 1950. Unpublished report (k.č. 1043/1950), Archaeological Institute, Slovak Academy of Sciences, Nitra, pp. 1-2. [In Czech.]