

## Domnevna musterjenska piščal iz Divjih bab I: psevdoartefakt ali prava piščal ali kdo je naredil luknje

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### Izvleček

Avtorji v prispevku predstavijo novo, doslej neznano, revolucionarno tehniko za izdelavo lukenj v kosteh. Ob tej priliki povzamejo tudi celotno debato o musterjenski piščali iz Divjih bab I in zaključijo, da je domneva o umetnem nastanku lukenj v musterjenski piščali verjetnejša od katere koli druge domneve.

Stare teze o izvoru lukenj v kosteh v paleolitskih najdiščih so dobile leta 1995 nov zagon z vsem dobro znano najdbo v Divjih babah I (odslej D. b. I). Tisto, kar je bilo pri tej nepričakovani najdbi najbolj privlačno in vznemirjujoče, je bila njena starost in pripadnost musterjenu. Na podlagi tega izziva se je v naslednjih letih dokončno izoblikovala sto let porajajoča se teorija o luknjah v fosilnih kosteh.

Najditelji zanimive najdbe, ki je takoj dobila oznako "domnevna musterjenska piščal", so postavili dve hipotezi (Turk et al. 1995) z namenom, da se ugotovi, katera je verjetnejša. Že ob odkritju je bilo namreč jasno, da absolutnih dokazov za eno ali drugo hipotezo ni in da jih nikoli ne bo.

Namen najditeljev je bil v hipu dosežen. Začelo se je zelo intenzivno preverjanje obeh hipotez.

Nekateri vplivni kritiki hipoteze o piščali, ki so bili hkrati zagovorniki hipoteze o kosti, preluknjani z zobmi, so s precenjevanjem lastnih dokazov in podcenjevanjem nasprotnih argumentov hitro uspeli prepričati znatni del arheološke stroke, ki ni imel lastnega mnenja ali želje, da bi se poglobljeno ukvarjal s problemom najstarejše piščali (glej Horusitzky 2003). Zanimivo pa je, da jim ni uspelo prepričati javnega mnenja. Posledica takšnega stanja je bila,

### Abstract

The authors present in the contribution a revolutionary technique for making holes in bones to date unknown. They take this opportunity to summarise the whole debate about the Mousterian flute from Divje babe I and conclude that a presumption of an artificial creation of the holes in the Mousterian flute is more likely than any other presumption.

da je bilo najditeljem sporne piščali 'demokratično' onemogočeno, da bi odgovorili na kritiko hipoteze o piščali, ki je izšla v vodilni arheološki reviji *Current Anthropology*. Avtorja odmevne kritike Ph. Chase in A. Nowell (1997) za to nista kriva, saj sta ravnala strokovno korektno in nikakor ne sodita v zgoraj navedeno skupino kritikov. Zato je bil odgovor vsem kritikom objavljen samo v *Arheološkem vestniku* (Turk et al. 2001).

Ko je že kazalo, da je zadeva po strokovni plati zaključena in da se v sto let trajajočih razpravah o luknjah v kosteh debata ne bo premaknila iz mrtve točke, je zgodba o najstarejši domnevni piščali končno dobila svoj pravi epilog.

Domneva o umetnem izvoru lukenj, ki so jo nekateri silovito spodbijali, čeprav nikoli dovolj prepričljivo, je po zaslugi F. Z. Horusitzkega (Horusitzky 2003) postala absolutno mogoča. Luknje v kosteh je namreč mogoče narediti tudi s koščenim prebijačem oziroma šilom s topo konico. Pri tem nastanejo luknje, ki so lahko do najmanjše podrobnosti podobne luknjam, narejenim z zobmi. Postopek izdelave takšnih lukenj je tako enostaven, da so ga naši paleolitski predniki lahko odkrili in udejanili, saj zanj niso potrebna nikakršna izpopolnjena orodja (*sl. I*).



*Sl. 1:* Poskusno preluknjana stegenica enoletnega rjavega medveda in komplet poskusnega orodja, potrebnega za luknjanje. Manjka lesen tolkač. Spodnje tri luknje so v celoti izklesane, četrta na vrhu je prebita. Foto: T. Lauko.

*Fig. 1:* Test pierced femur of a one year old brown bear and set of test tools needed for piercing. A wooden mallet is lacking. The lower three holes are chiselled in entirety, the fourth from the bottom is punched. Photo: T. Lauko.

Najprej s koničastim kamenim orodjem in lesenim tolkačem izklešemo v kost plitko vdolbinico, ne da bi kost preluknjali (*sl. 2*). Nato s koščnim prebijačem in lesenim tolkačem na mestu jamice z enim ali nekaj udarci prebijemo luknjo (*sl. 3*). Ker prebijač deluje podobno kot zob, lahko kost vzdolžno počī, vendar predvsem na strani, kjer je luknja.

Kadar kost počī pri stiskanju in prediranju z zobmi, počī vedno na zgornji in spodnji strani zaradi pritiska zgornjega in spodnjega zoba (Turk et al. 2001). To se pri domnevni piščali očitno ni zgodilo, ker bi se kost sicer tudi razklala na dvoje. Neprekinjena vzdolžna razpoka je samo na ploski hrbtni strani, kjer sta ohranjeni dve popolni in ena delna

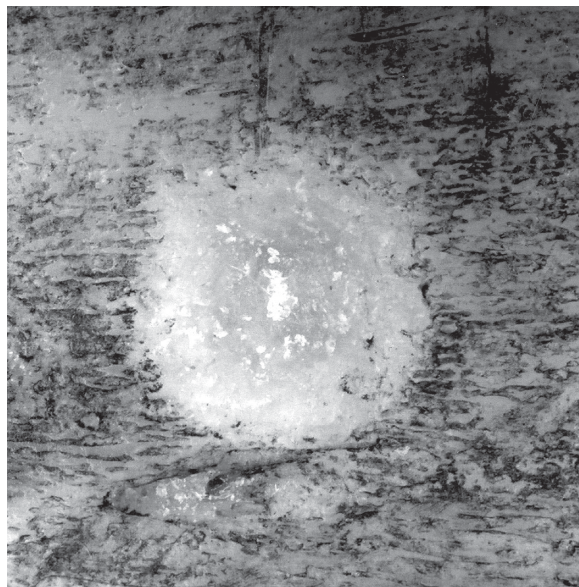
luknja (glej Horusitzky 2003, sl. 4: b, Turk et al. 2001, sl. 21).

Enostranska razpoka je nov argument, ki podpira domnevo, da je luknje naredil človek. Ta dokaz pride do veljave tudi pri nekoliko mlajši domnevni piščali iz jame Istállóskő na Madžarskem (glej Horusitzky 2003, sl. 1: b).

Na podlagi novih in starih ugotovitev (Turk et al. 2001) o izdelavi lukenj v kosteh lahko v musterjenskih in orinjasjenskih najdiščih v prihodnje prepoznamo običajno spregledana ali neupoštevana preprosta orodja za luknjanje, kakor tudi domnevne izdelke in polizdelke razen lesenih. Še več, prepoznamo lahko tudi poškodbe orodij in njihove poškodovane dele, ki bi domnevno nastali pri izdelovanju lukenj. Treba je samo preusmeriti tok raziskav, ki je doslej tekkel v smeri odvracanja pozornosti od vsega še neznanega k znanemu, sodeč po objavah nasprotnikov domnevne piščali. Katera pot, naša ali naših nasprotnikov, pelje iz labirinta znanstvenih zmot in zablod, pa naj na podlagi vseh objavljenih del ocenijo bralci sami.

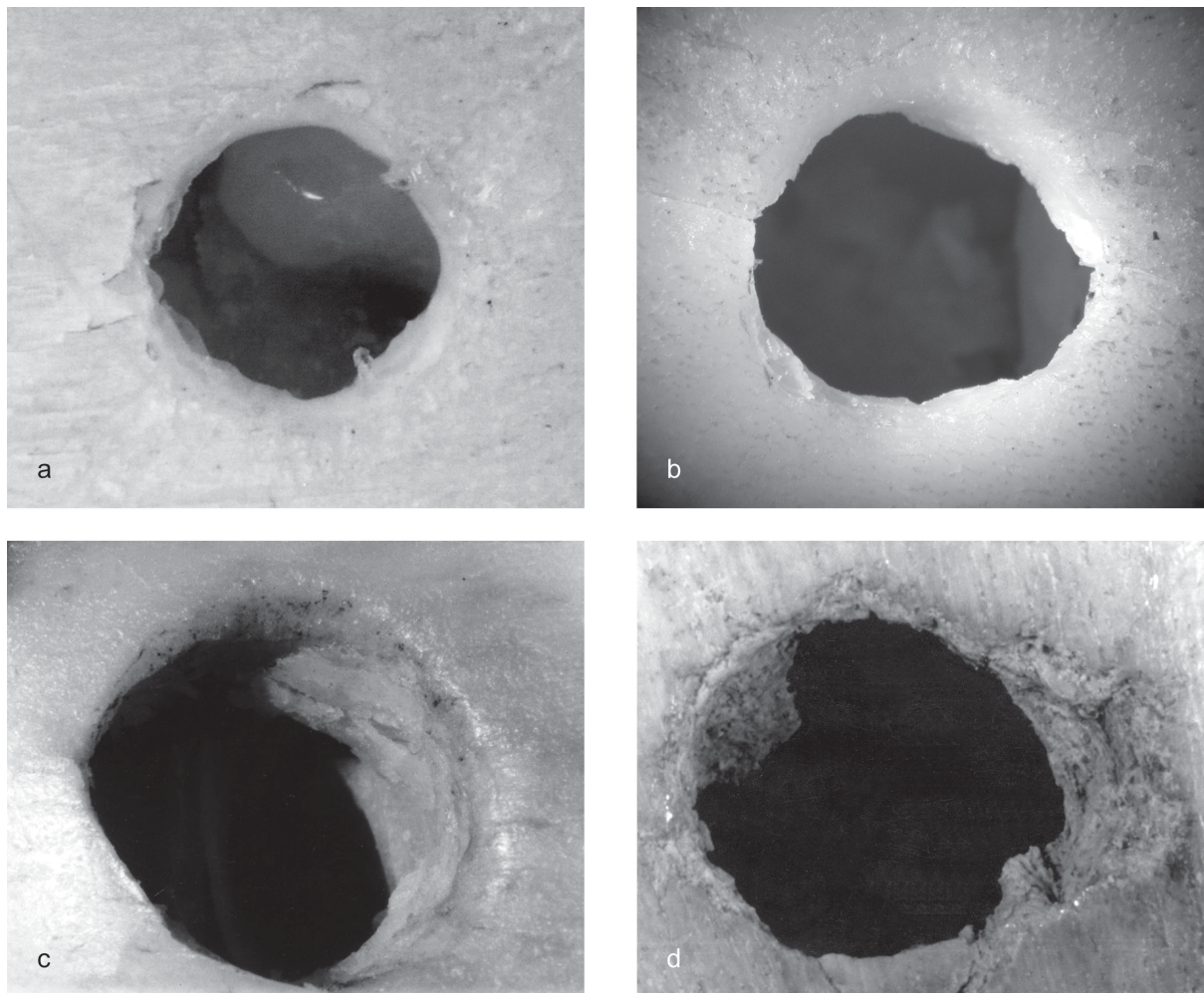
Nikoli nismo trdili in ne trdimo, da je najdba iz Divjih bab I musterjenska piščal, trdili pa smo in trdimo, da je **lahko** musterjenska piščal in zato najstarejša poznana piščal doslej. Svojo tezo smo zaenkrat (kar pomeni, da z dokaznim postopkom še nismo končali) podkrepili z naslednjimi dokazi:

Po zaslugi najnovejših raziskav B. Blackwellove in I. Turka kronologija najdišča in domnevne piščali iz D. b. I ni več odprto vprašanje. Nedvomno gre



*Sl. 2:* Poskusna predhodna vdolbinica, izklesana s koničastim kamnitim orodjem (glej *sl. 1*). Foto: M. Pflaum.

*Fig. 2:* Shallow pit made in the bone (see Fig. 1) using an experimental stone tool (see Fig. 1). Photo: M. Pflaum.



Sl. 3 a-c: Poskusni luknji, predrti s koščnim prebijačem (a-b), poskusna luknja predrta z umetnim medvedjim kaninom (c) in luknja na fosilni kosti, ki jo je domnevno predrl jamski medved s kaninom (d). Foto (a-d): M. Pflaum, M. Jeršek, F. Cimerman in F. Cimerman.

Fig 3: Test holes, pierced with a bone punch (a-b), test hole, pierced with artificial canine tooth of bear (c) and hole in fossil bone presumably pierced by a cave bear with canine tooth (d). Photo (a-d): M. Pflaum, M. Jeršek, F. Cimerman and F. Cimerman.

za najstarejšo najdbo te vrste, ki je vsaj 10 000 let (10 ka) starejša od vseh splošno priznanih najdb paleolitskih piščali. Najdba je dokončno povezana z neandertalcem, ker je bila dobesedno zacementirana v sediment (fosfatno brečo) pred 40 ka. Sediment je bil odložen v zmerni in vlažni klimatski fazi, ki ustreza interstadialu Moershoofd v prvi polovici kisikove izotopne stopnje (OIS) 3 (Turk et al. 2001; 2002). V tem času še ni sledu o fizični in/ali kulturni prisotnosti anatomsko modernih ljudi (AMH) v srednji Evropi.

Do nedavnega je prevladovalo mnenje, da so prve piščali v Evropi naredili AMH. Domnevna piščal iz D. b. I pa je stara med 40 in 50 ka, medtem ko so najstarejše priznane piščali stare 30 do 40 ka.

Kar je vprašljivo od vsega začetka, je razlaga najdbe (glej Turk et al, 1995).

Najdba (večkrat preluknjana stegnenica mladega jamskega medveda) je nedvomno enkratna, ker nima prave primerjave med milijoni poznanih skeletnih ostankov jamskega medveda v Sloveniji in drugod po Evropi.

Edina stvar, ki je piščali podobni najdbi iz D. b. I skupna z najstarejšimi spornimi ali nespornimi piščalmi, so luknje, ki niso izvrtane.

Izvor lukenj, ki je osnovno vprašanje pri vseh (koščnih) piščalih, lahko razložimo na dva možna načina.

Po prvem je luknje naredil neandertalec z namenom, da dobi iz votle kosti piščal (B. A. Blackwell, M. Otte, I. Turk in drugi).

Po drugem je luknje naredil jamski medved ali hijena s kanini in sicer z več zaporednimi vgrizi (G. Albrecht, Ph. Chase, F. d'Errico, A. Nowell, P. Villa in drugi).

Prva razlaga je podprta z najdbami številnih koničastih kamnitih orodij v D. b. I in drugih bolj ali manj istočasnih najdiščih. Ta orodja so bila namenjena luknjanju in prebadanju. V D. b. I so bili najdeni tudi odlomljeni vršički konic teh orodij z značilnimi makroskopskimi poškodbami čelnega dela, ki nastanejo pri uporabi koničastih orodij za obdelavo trdih materialov, npr. kosti (Turk et al. 2001, sl. 27, t. 5-7).

Glavna pomanjkljivost prve razlage je bila v tem, da so luknje brez sledov kamenega orodja, s katerim naj bi bile izdelane in brez sledov obrabe, ki nastanejo pri (dolgotrajni) rabi predmeta. Ti sledovi so lahko sčasoma izginili.

S poskusi, ki sta jih opravila G. Bastiani in I. Turk v letih 1997-2000, je bilo potrjeno, da lahko luknje izklešemo s koničastim orodjem in da lahko pri tem ne ostane na robovih lukenj nikakršna prepoznavna sled orodja. Tako izklesanim luknjam je močno podobna ena izmed lukenj na piščali, vendar ne do potankosti. S prebijanjem lukenj dobimo tudi podrobnosti, ki so prisotne na robovih lukenj piščali iz D. b. I. Zahtevak po sledovih kamenega orodja postane pri prebijanju lukenj s koščnim prebijačem nesmiseln. Za izdelavo lukenj, nepravilnih oblik, zadostujejo t. i. *ad hoc* orodja. Poskuse s prebijanjem lukenj sta ločeno opravila F. Z. Horusitzky in I. Turk leta 2003.

Druga razlaga je podprta z odkritjem (mikroskopskih?) sledov grizenja na površini kosti (d'Errico 2003, 37, sl. 9), z delno odgriznjem koncem kosti (distalna metafiza), ki se končuje v sklep in z (domnevno) luknjo pod eno izmed lukenj, kar je značilno za stiskanje kosti z zgornjim in spodnjim zobom (G. Albrecht, F. d'Errico, Ph. Chase in A. Nowell).

Pomanjkljivosti druge razlage so naslednje (I. Turk in sodelavci):

1.) Sledovi zob in druge poškodbe so lahko nastale naknadno ali predhodno ali kot stranski proizvodi pri izdelovanju lukenj. Naknadne sledove zob poznamo na nekaterih paleolitskih koščnih artefaktih (Turk et al. 2001, sl. 20).

2.) Luknji, druga pod drugo, bi morali biti bolj odmaknjeni druga od druge kot dejansko sta, zaradi nepopolne okluzije konic kaninov, ki se povečuje z velikostjo kaninov. Jamski medved je bil zver z zelo velikimi kanini.

3.) Nobenega direktnega dokaza ni, da bi luknje na piščali naredile zveri. Kakšne so take luknje in kako nastanejo, je natančno znano na podlagi poskusov I. Turka (Turk et al. 2001). S poskusi je potrjeno, da nastane večina lukenj, narejenih z zobmi, na izbočeni strani steg-nenice in ne na ravni strani, kot je to primer pri piščali iz D. b. I. Kost običajno počni na sprednji in zadnji strani že pri prvem stisku zob. To se pri piščali ni zgodilo. Piščal je počena samo na eni, ravni strani, kjer je največ lukenj.

4.) Pri grizenju s kanini je praktično nemogoče narediti luknje v ravni črti, torej tako kot so na piščali (Horusitzky 2003, sl. 4 b).

5.) Jamski medved, ki bi se z zobmi lotil kosti, iz katere je narejena domnevna piščal, bi kost zelo verjetno zdrobil, saj bi jo moral vsaj trikrat močno stisniti z zobmi, preden bi iz nje naredil piščal.

Tehtnega dokaza za eno ali drugo razlago torej ni bilo in rezultat široke mednarodne diskusije je ostal neodločen in zato sterilen vse do nedavnega, ko se je v debato vključil F. Z. Horusitzky. Od tedaj dalje je prva razlaga, ki pravi, da je luknje naredil neandertalec, popolnoma realna in lahko prenese vse napade nasprotnikov takšne interpretacije.

Po razpravi o luknjah lahko nadaljujemo razpravo o piščalih.

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D'ERRICO, F., A. NOWELL et al. 2003, Archeological evidence for the emergence of language, symbolism and music. - *Journal of World Prehistory* 17/1, 1-70.

HORUSITZKY, F. Z., 2003, Les flûtes paléolithiques: Divje babe I, Istállóskő, Lokve etc. Point de vue des experts et des contestataires. (Critique de l'appréciation archéologique du spécimen n° 652 de Divje babe I et arguments pour la défense des spécimens Pb51/20 et Pb606 du MNM de Budapest) [Palaeolithic flutes: Divje babe I, Istállóskő, Lokve etc. Viewpoints of experts and their adversaries. (Critique

of archaeological appreciation of the Divje babe I specimen n° 652 and arguments to defend the specimens Pb51/20 and Pb606 in HNM in Budapest)]. - *Arh. vest.* 54, 45-66.

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TURK, I., J. DIRJEC in B. KAVUR 1995, Ali so v Sloveniji našli najstarejše glasbilo v Evropi? (The oldest musical instrument in Europe discovered in Slovenia?). - *Razpr. 4. razr. SAZU* 36, 287-293.

## Putative Mousterian flute from Divje babe I (Slovenia): pseudoartefact or true flute, or who made the holes

Translation

Old theses on the origin of the holes in bones at palaeolithic sites gained new impetus with the widely known find in Divje babe I (hereinafter: D. b. I) What was most attractive and exciting about this unexpected find was its age and that it belonged to the Mousterian. On the basis of this challenge, in the following years the century old theory of holes in fossil bones finally took shape.

The discoverers of the interesting find, which was immediately denoted the "putative Mousterian flute" put forward two hypotheses (Turk et al. 1995), with the idea of ascertaining which was the more probable. It was already clear at the time of the discovery that there would never be absolute proof of one or other hypothesis.

The finders' aim was instantly achieved. A very intensive verification of both hypotheses immediately began.

Some influential critics of the flute hypothesis, who were simultaneously advocates of the hypothesis of bones pierced by teeth, by overvaluing their own evidence and undervaluing the counter-arguments, quickly succeeded in convincing a significant part of the archaeological profession that did not have its own opinion or the desire to enter deeply into the question of the oldest flute (see Horusitzky 2003). It is interesting that they did not succeed in convincing public opinion. The result of such a state was that the finders of the disputed flute were "democratically" prevented from answering the criticism of the flute hypothesis that had been published in the leading archaeological journal *Current Anthropology*. The authors of the widely read criticism, Ph. Chase and A. Nowell (1997), were not to blame for this, since they behaved professionally correctly and in no way belong in the aforementioned group of critics. So the answer to all criticisms was only published in *Arheološki vestnik* (Turk et al. 2001).

When it already seemed that the matter was closed on a professional level, and that the century-old debate on holes in bones would not move forward from the point of stagnation, the story of the oldest putative flute finally obtained its real epilogue.

The hypothesis of the artificial origin of the holes, which some archaeologists forcefully impugned, although never fully persuasively, suddenly became entirely possible thanks to the work of F. Z. Horusitzky (Horusitzky 2003). Holes in bones, in fact, can also be made with a bone punch or awl with a blunt tip. Holes are thus made that are similar to holes made with teeth, down to the smallest detail. The procedure of making such holes is so simple that our palaeolithic forebears could have discovered and achieved it, since they did not need a perfect tool for it (*Fig. 1*).

First, a shallow pit is made in the bone, using a pointed stone tool and a wooden mallet, without piercing the bone (*Fig. 2*). A hole is then pierced with a bone awl and wooden mallet at the place of the hollow, with one or more blows (*Fig. 3*). Since the punch acts similarly to teeth, the bone may crack longitudinally, but mostly on the side on which the hole is.

When a bone cracks because of pressing and piercing with teeth, it always cracks on the upper and lower side, because of the pressure of the upper and lower teeth (Turk et al. 2001). This clearly did not happen with the putative flute, because the bone would also have split into two. There is only an unbroken longitudinal crack on the flat back side, where two complete and one partial hole are preserved (see Horusitzky 2003, *Fig. 4: b*; Turk et al. 2001, *Fig. 21*).

A one-sided crack is a new argument which supports the hypothesis that the holes are manmade. This evidence also applies

to the slightly younger putative flute from Istállóskő cave in Hungary. As another example of manmade hole we can cite the Badlhöhle find, examined recently in Graz (see Horusitzky 2003, *Fig. 1: b* and *Fig. 4: a*).

On the basis of new and old findings (Turk et al. 2001) on making holes in bones, it is possible in the future to recognize at Mousterian and Aurignacian sites simple (*ad hoc*) tools for piercing that are normally overlooked or unconsidered, as well as putative products and semi-products, except wooden ones. Furthermore, we can also recognize damaged tools and their damaged parts which might be suspected of having occurred in making holes. It is only necessary to redirect the current of research, which has so far flowed in the direction of rejecting attention from anything unknown to the known, judging by the publications of opponents of the putative flute. Readers themselves should decide on the basis of all the published work which path, ours or that of our opponents, leads from the labyrinth of scientific error and delusion.

We have never claimed and do not now claim that the find from Divje babe I is a Mousterian flute, but we have claimed and do so now that it may be a Mousterian flute and therefore the oldest known flute to date. For the moment (which means that we have not yet completed the evidential procedure) we underpin our thesis with the following evidence:

Thanks to the most recent analyses by B. Blackwell and I. Turk, the chronology of the site and the putative flute from D. b. I is no longer in question. It is indisputably the oldest find of its kind, at least 10,000 (10 ka) years older than other generally accepted finds of Palaeolithic flutes. The find is definitely associated with Neanderthal man, since it was cemented into the sediment (phosphate breccia) more than 40 ka ago. The sediment was deposited in a temperate and humid climatic phase that correlates with the Moershoofd Interstadial in the first half of Oxygen Isotope Stage (OIS) 3 (Turk et al. 2002). At that time, there was still no trace of the physical and/or cultural presence of anatomically modern humans (AMH) in Central Europe.

It had previously been believed that AMH had made the first flutes in Europe. The putative flute from D. b. I is between 40 and 50 ka old, while the oldest recognised flutes are 30 to 40 ka old.

What has been in question from the very start is the explanation of the find (see Turk et al. 1995).

The find itself (a multiply pierced thigh bone of a young cave bear) is undoubtedly unique in the Mousterian, since there are no suitable counterparts among the millions of skeletal remains of cave bear in Slovenia and elsewhere in Europe.

The only thing that the flute-like find from D. b. I has in common with the oldest, disputed or undisputed flutes is the holes, which are not drilled.

The origin of the holes, which is an essential question for all (bone) flutes can be explained in two possible ways.

According to the first explanation, a Neanderthal made the holes in order to construct a flute from the hollow bone (B.A.B. Blackwell, M. Otte, I. Turk and others).

According to the other explanation, a cave bear or hyena made the holes with its canines, with a number of consecutive bites (G. Albrecht, Ph. Chase, F. d'Errico, A. Nowell, P. Villa and others).

The first explanation is supported by the find of numerous pointed stone tools in D. b. I and other more or less contemporary sites. These tools were intended for piercing and stabbing.

Fragments of the tips of such tools were also found in D. b. I, with characteristic macroscopic damage to the forepart that arises from the use of a pointed tool on hard materials such as bone (Turk et al. 2001, Fig. 27, Tab. 5-7).

The main shortcoming of the first explanation was that the holes have no traces of stone tools by which they could have been made and have no traces of (long) use which could, evidently, disappear with the ages.

The experiments performed by G. Bastiani and I. Turk in 1997-2000, confirmed that holes can be chiselled with a pointed tool and that there are no traces of the tool on the edges of the holes. Such chiselled holes bear a strong resemblance to one of the holes on the flute but are not entirely identical. By punching holes we also get details that are present on the edges of the holes of the flute from D. b. I. The requirement for traces of a stone tool ceases to have meaning when holes are punched with a bone punch. *Ad hoc* tools are sufficient for making holes of irregular shape. F. Z. Horusitzky and I. Turk conducted separate experiments in punching holes, in 2003.

The second explanation is supported by the discovery of (microscopic?) traces of biting on the surface of the bone (d'Errico et al. 2003, 37, fig. 9), by the partially bitten off end of the bone that leads to the joint and by the (suspected) hole beneath one of the holes (G. Albrecht, F. d'Errico, Ph. Chase and A. Nowell).

The shortcomings of the second explanation are the following (I. Turk and associates):

1.) The traces from teeth and other damage could have originated subsequently or previously or were products of punching the holes. Subsequent traces of teeth are known on other palaeolithic bone artefacts (Turk et al. 2001, Fig. 20).

2.) Holes one below the other should be further separated from each other than they are in fact, because of the imperfect occlusion of the canines, which increases with the size of the canines. It is well known that cave bears had very large canines.

3.) There is no direct evidence that the holes on the flute were punched by beasts. What such kinds of punched holes were and how exactly they arise is known on the basis of the experiments by I. Turk (Turk et al. 2001). It was proven experimentally that the majority of holes made by teeth arise on the convex side of the thigh bone, and not on the flat side, as is the case with the flute from D. b. I. The bone typically cracks along the front and back sides with the first clenching of the teeth. This did not happen with the flute. The flute is

cracked only on one, the flat side, where there are the most holes

4.) In the process of biting with canine teeth, it is practically impossible to make holes in a straight line, such as they are on the flute (Horusitzky 2003, Fig. 4: b).

5.) A cave bear that started biting the bone from which the putative flute is made would very likely shatter the bone, since it would have to press strongly at least three times before making a flute from it.

There was thus no weighty evidence for one or the other explanation, and the result of a wide international discussion remained undecided, and thus sterile, until recently, when F. Z. Horusitzky joined the debate. From now on, the first explanation, which says that a Neanderthal made the holes, is entirely realistic and can withstand all counter-arguments to such an interpretation.

After the debate on the holes we are ready to continue the debate on the flutes.

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