Podium Presentation: Session 7, Sa (8:20)

New Data on the Context of the Middle Paleolithic Bone Tools from Abri Peyrony and Pech-de-l'Azé I (France)

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The sites of Abri Peyrony and Pech-de-l'Azé I are located in SW France about 35 km from one another. Both sites have been known for 100 years with multiple excavations that have consistently yielded Mousterian of Acheulian Tradition (MTA) stone tool industries with no overlying Upper Paleolithic industries. More recently these sites were re-opened by our respective teams to re-assess the stone tool and faunal assemblages in an updated geological, chronological, and paleoenvironmental context. This work resulted in the discovery of four nearly identical bone tools (three from two separate levels at Abri Peyrony and one from Pech-de-l'Azé I) that are comparable to lissoir, a tool type previously known only from Upper Paleolithic contexts including the Châtelperronian (Soressi et al. 2013). Whereas most previously reported Middle Paleolithic bone tools are an extension of existing stone technologies into a new raw material type, these bone tools are manufactured with distinct techniques and exploit properties of bone that differ from stone. They were likely used for purposes that stone was unable to address. Late Neandertal behavior in western Europe is marked by changes in the material culture that parallel developments in assemblages shown or considered by many to be associated with modern humans. Debate continues on whether these changes predate the arrival of modern humans in Europe or whether they are the result of modern humans. Until recently the MTA has been considered part of the period pre-dating modern arrivals; however, recent dates continue to push the arrival of modern humans still earlier and some MTA assemblages appear to have continued quite late. Seven 14C AMS age determinations on cut-marked bone from the Abri Peyrony layer containing the lissoir produced an age range of 47,710 to 41,130 cal BP, which overlaps with evidence of modern humans in western Europe. OSL dating of the Pech-de-l'Azé I lissoir produced a weighted mean age of 51.4 ± 2.0 ka. Even with the statistical uncertainties, this age makes the lissoir from Pech-de-l'Azé I the oldest specialized bone tool in Europe and it pre-dates the best evidence of modern humans in Europe. However, it is contemporaneous with industries such as the Bohunician from central Europe that may represent modern humans in Europe but for now has no associated bone preservation. Here we present additional OSL dates from Pech-de-l'Azé I that place the Level 4 dates in the context of the complete sequence. For Abri Peyrony, we also present new OSL ages using the same protocol that was applied at Pech-de-l'Azé I. These data are complemented by a now completed analysis of the faunal assemblages associated with the two levels from Abri Peyrony that contain lissoir. Finally, new data on the industrial attribution of the basal lissoir level are presented based on an expanded sample from this level. This latter point is important for establishing whether lissoir are exclusive to the MTA or simply a late Middle Paleolithic phenomenon.

References:2013. "Neandertals Made the First Specialized Bone Tools in Europe" Proceedings of the National Academy of Science (United States) (Marie Soressi, Shannon P. McPherron, Michel Lenoir, Tamara Dogandzic, Zenobia Jacobs, Yolaine Maigrot, Chris Miller, William Rendu, Mike Richards, Matt Skinner, Teresa Steele, Sahra Talamo, Jean-Pierre Texier).

Poster Presentation Number 36, Fr (18:00-20:00)

Denisovan girl manual phalanx: developmental age and patterns of bone formation from x-ray volumetric microscopy

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An important breakthrough in knowledge about the taxonomic status of the early inhabitants of Southern Siberia was achieved thanks to paleogenetic studies. Based on the sequencing of mitochondrial DNA extracted from the infant distal phalanx of the fifth manual digit from stratum 11, it was concluded that the Altai hominin was genetically twice further from modern humans than were Neanderthals (Krause et al., 2010). Total sizes of the phalangeal fragment without sinostosis led B.Viola to conclude about possible biological age as 6-7 years. In new study of the same phalanx of Denisovan girl we used the nondestructive method of volumetric X-ray microscopy (the resolution < 0.7 μm). Our purposes were histological estimation of developmental age, as well observation of microstructural patterns in comparative view. It is detected that diaphyseal and metaphyseal parts of the bone reflected the different stages of bone formation and grew active till the death of individual. The lamellar structures predominance, rare osteons in the slices from diaphyseal wall are typical for 6-7 years of modern human development. Opposite, quite "adult" histological picture was earlier described for close age juvenile Neanderthal from Okladnikov Cave in Altai (Dobrovolskaya, Mednikova, 2011, 2013). It can be supposed that growth tempo for Denisovans were similar modern humans in contrast to the specific patterns of Neanderthal growth and ageing.

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References: Dobrovolskaya M., Mednikova M., 2011. Microanatomical investigation of South Siberian Neanderthals, Abstracts of Meeting of European Society of the Study of Human Evoltion, Leipzig 23-24 September, 2011, p.27. Dobrovolskaya M., Mednikova M., 2013. "Adult" children of Neanderthals: histological study of juvenile individuals from Okladnikov Cave, Fundamental problems of archaeology, anthropology and ethnography of Eurasia. Novosibirsk, p. 523-537. Krause J., Fu Q., Good J.M., Viola B., Shunkov M.V., Derevianko A.P., Paabo S. 2010. The complete mitochondrial DNA genome of an unknown hominin from southern Siberia, Nature, V.464, p.894-897. Mednikova M., Dobrovolskaya M., Viola B., Lavrenyuk A., Kazanski P., Shklover V., Shunkov M., Derevianko A., 2013. Radiological microscopy of manual phalanx of girl from Denisova Cave // Archaeology, ethnography and anthropology of Eurasia, v.3 (55), p.120-125.