
Relationship between precision and size of flake technology in the Middle Paleolithic. An experimental study.

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Résumé

Microlith production is usually related to Upper Paleolithic and Mesolithic technology (Kuhn, 2002), however, small tools have been documented since the Lower Paleolithic (Burdukiewicz and Ronen, 2003; Parush et al., 2015). Recent studies have emphasized the relevance of microlithic productions in Middle Paleolithic, so this seems to be an important aspect to understand Neanderthal adaptations, technological evolution and economic organization (Kuhn, 1995; Kuhn y Elston, 2002; Dibble y McPherron, 2006; Rios-Garaizar, 2010; Villaverde et al., 2012; Lemorini et al., 2015; Rios-Garaizar et al., 2015; Patiño et al., 2017). The production of small flakes in Middle Paleolithic has been interpreted as a simple technological solution to cope with difficulties to access good quality raw material (Kuhn, 1995). However, new investigations suggest that the emergence of these types of tools could be part of planned behavior by Neanderthals, and that the objective was to produce precision tools (Dibble and McPherron, 2006; Rios-Garaizar, 2010; Villaverde et al., 2012; Lemorini et al., 2015; Rios-Garaizar, 2015).

The link between size and precision has been invoked several times but almost no empirical evidence was available. The objective of this investigation is to evaluate, from an experimental perspective, if there is a link between precision and size of flakes. The results of this experimentation will allow us to corroborate or falsify the existence of such link, and will give us new empirical arguments to discuss the reasons of microlith production in Middle Paleolithic.

A group of 50 participants took part in the experimental test, which consisted in measuring the precision of small (> 3 cm) and big (> 5 cm) Levallois flakes when used to follow predefined cutting patterns. The error was precisely estimated calculating the area of error (area originated between the predefined pattern and the actual tracing), and the results were statistically analyzed. Initial results show that there are not significant differences in precision between small and big Levallois flakes, so the presence of a relevant assemblage of small tools wouldn't be explained only by the need of precision tools. Following this argument, there must be multiple causes that explain the resource of small flake production (raw material availability, site function, settlement patterns, intensity or duration of occupations, etc.), which in any case allowed the realization of precision task with less expenditure of raw material.

*Intervenant

References:

- BURDUKIEWICZ, J.M., RONEN, A. 2003. Research problems of the Lower and Middle Palaeolithic small tool assemblages. En: *Lower Palaeolithic Small Tools in Europe and the Levant*, J.M. Burdukiewicz, A. Ronen (Eds.):235-238. BAR International.
- DIBBLE, H.L., MCPHERRON, S.P. 2006. The Missing Mousterian. *Current Anthropology*, 47(5): 777- 803.
- KUHN, S.L. 1995. *Mousterian Lithic Technology: An Ecological Perspective*. Princeton University Press.
- KUHN, S. 2002. Pioneers of Microlithization: The "Proto-Aurignacian" of Southern Europe. En: *Thinking Small: Global Perspectives on Microlithization*, R. Elston, S. Kuhn (Eds.): 83-93. Arlington: American Anthropological Association.
- KUHN, S., ELSTON, R. 2002. Thinking Small Globally. En: *Thinking Small: Global Perspectives on Microlithization*, R. Elston, S. Kuhn (Eds.): 1-7. Arlington: American Anthropological Association.
- LEMORINI, C., VENDITTI, F., ASSAF, E., PARUSH, Y., y BARKAI, R. 2015. The function of recycled lithic items at late Lower Paleolithic Qesem Cave, Israel: An overview of the use-wear data. *Quaternary International*, 361: 103-112.
- RIOS-GARAIJAR, J. 2010. Organización económica de las sociedades neandertales: el caso del nivel VII de Amalda (Zestoa, Gipuzkoa). *Zephyrus*, 65: 15-37.
- RIOS-GARAIJAR, J. 2015. The visuo-spatial capacities of Neanderthals seen through material culture. *Journal of Anthropological Sciences*, 93: 173-176
- RIOS-GARAIJAR, J., EIXEA, A., VILLAVERDE, V. 2015. Ramification of lithic production and the search of small tools in Iberian Peninsula Middle Paleolithic. *Quaternary International*, 361: 188-199.
- PARUSH Y., ASSAF E., SLON V., GOPHER A., BARKAI R. 2015. Looking for sharp edges: Modes of flint recycling at Middle Pleistocene Qesem Cave. *Quaternary International*, 361: 61-87.
- PATÍÑO, F.Y., LUQUE, M., TERRADILLOS-BERNAL, M., MARTÍN-LOECHES, M. 2017. Biomechanics of microliths manufacture: a preliminary approach to Neanderthal's motor constraints in the frame of embodied cognition. *Journal of Anthropological Sciences*, 95: 1-16.
- VILLAVERDE, V., EIXEA, A., RIOS-GARAIJAR, J., ZILHÃO, J. 2012. Importancia y valoración de la producción microlevallois en los niveles II y III del Abrigo de la Quebrada (Chelva, Valencia). *Zephyrus*, 69: 13-32.

Mots-Clés: Neanderthal, precision, microlith, Middle Paleolithic