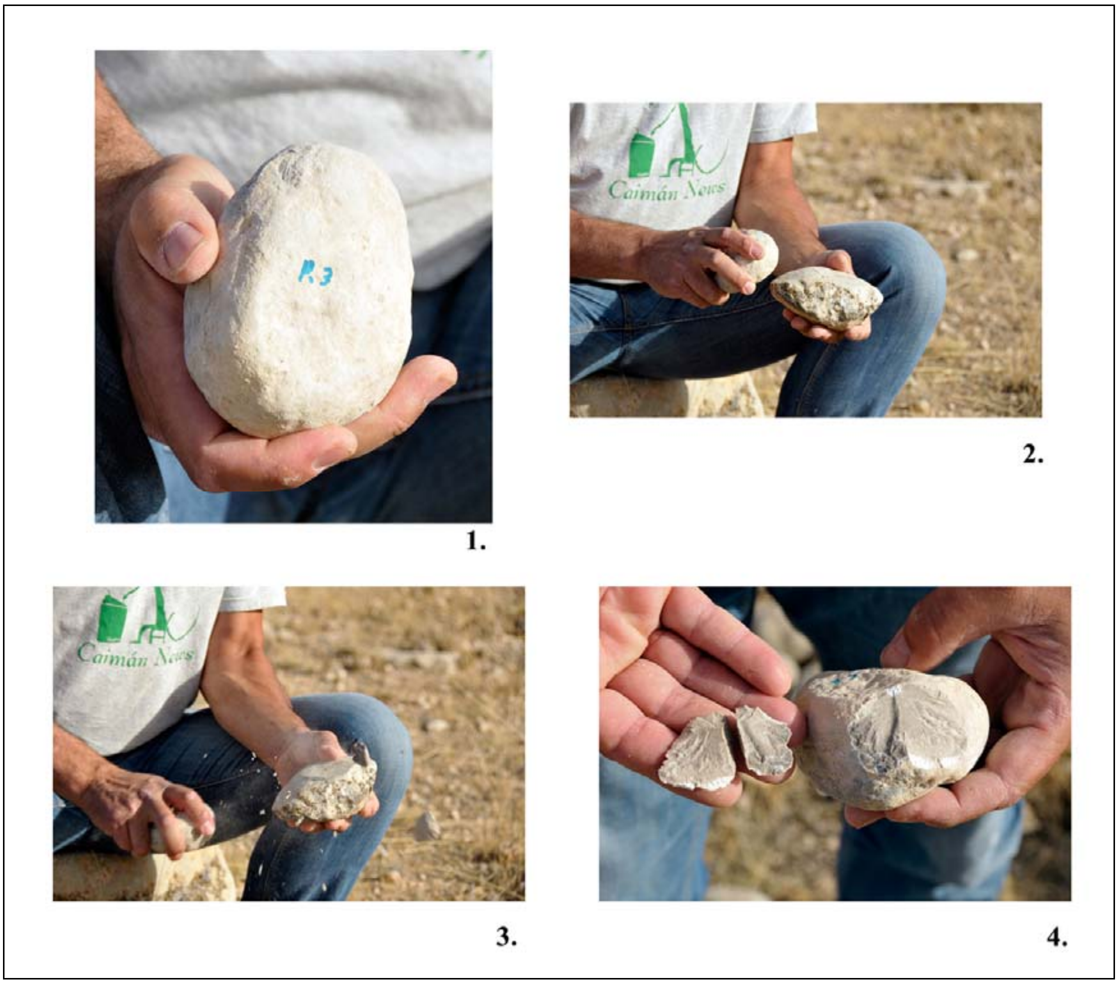
Barsky, D. *et al.* 2015. Limestone percussion tools from the late Early Pleistocene sites of Barranco León and Fuente Nueva 3 (Orce, Spain). *Phil. Trans. R. Soc. B* doi: 10.1098/rstb.2014.0352

Supplementary figures

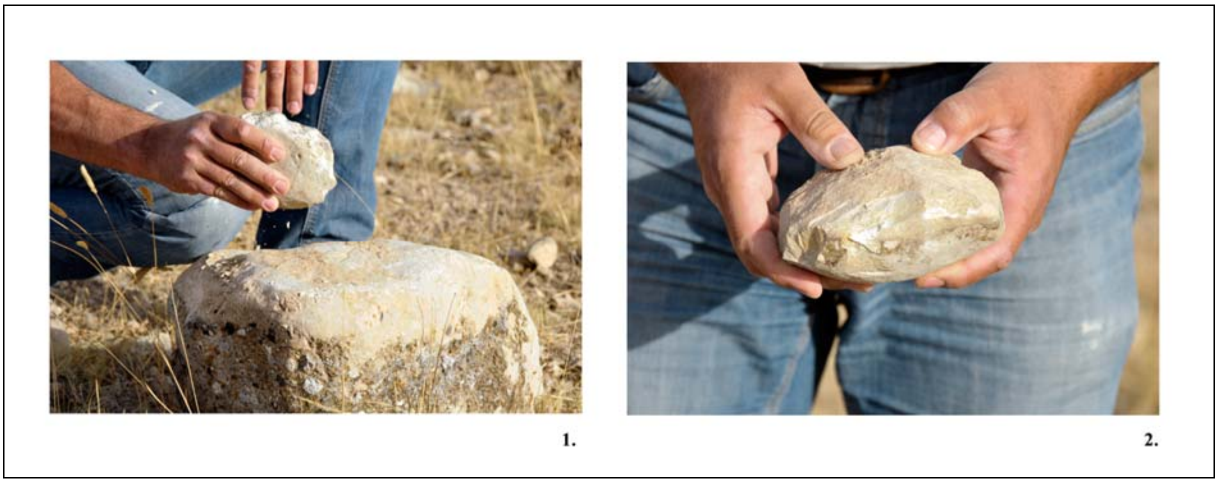
Limestone experiments

Knapping experiments were carried out in the field, at the silicious limestone outcrop near Fuente Nueva 3. This enabled us to freely select from pebbles and blocks with identical morphologies and petrographical qualities as those in the archeological samples of Barranco León and Fuente Nueva 3 (Orce, Andalusia).

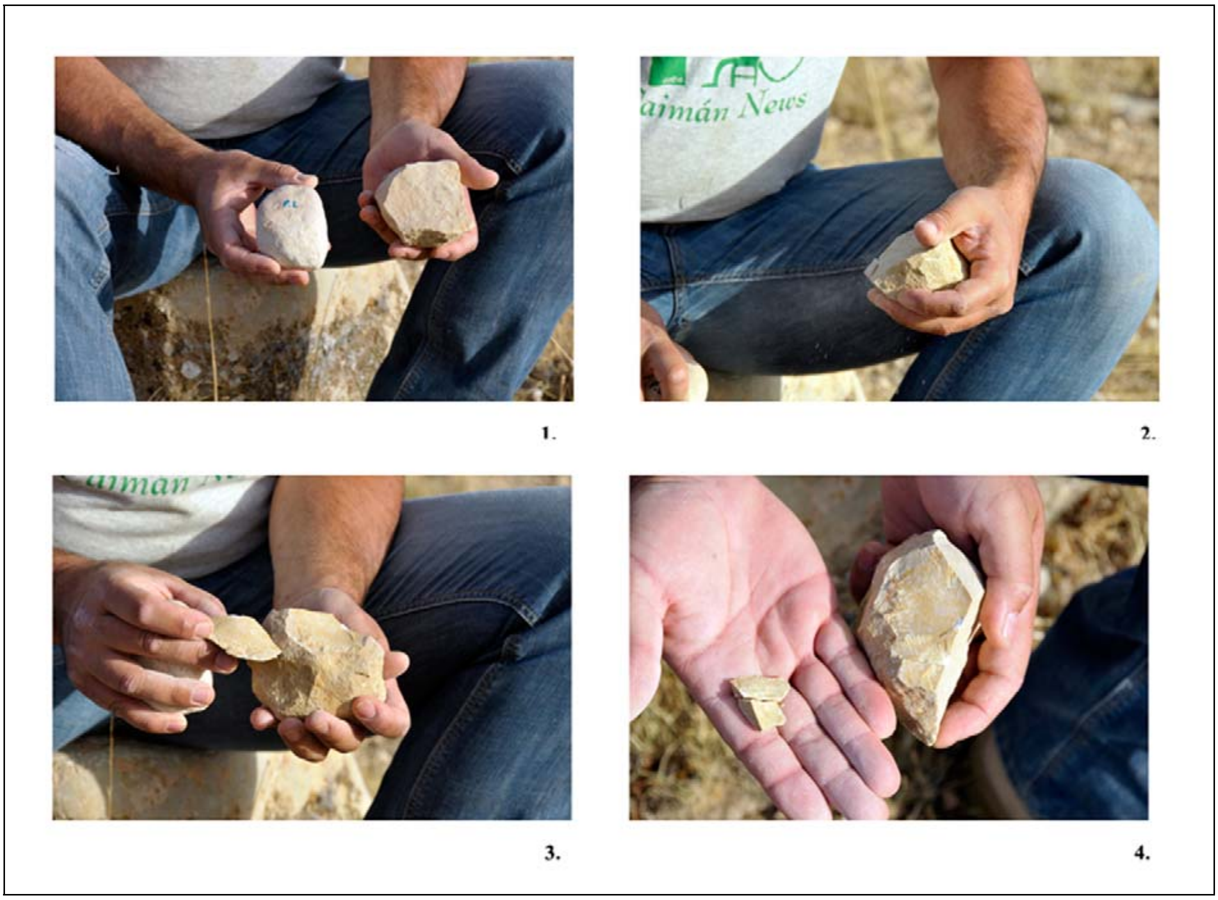


Supplementary Figure 1: Experimental limestone knapping. The aim of this experiment was to produce a chopper-core.1. Use of an oval shaped, fist-sized percussor. 2. & 3. A tangential gesture was applied to a quadrangular pebble to extract flakes. 4. The hammerstone broke after the first blow, leaving an abrupt removal negative on its extremity and accidentally producing a Siret type flake: both the scar and the flake are typical items in the Barranco León and Fuente Nueva 3 lithic assemblages (Photos by J. Mestre).

Supplementary Figure 2: Knapping of quadrangular limestone matrix to produce a chopper-core. 1. A slightly elongated, oval hammerstone with a plano-convex section was used to knap flakes by direct hammer method with a tangential gesture. 2. The hammerstone accidentally broke, leaving an elongated, cortical flake and its corresponding negative. 3. Traces of percussion adjacent to the accidental flake were left on the hammerstone after repeated contact with the matrix (Photos by J. Mestre).



Supplementary Figure 3: Direct impact on an anvil was tested to extract flakes. 1. A vertical gesture was used to produce flakes from a quadrangular matrix by hitting it against an anvil. 2. The flat, staged removal negatives obtained by this method are among the scar morphologies present on the limestone industries of Barranco León and Fuente Nueva 3 (Photos by J. Mestre).



Supplementary Figure 4: Controlled direct hammer knapping for flake production. 1. Direct hammer knapping of a polyhedral block using a small, rounded, fist-sized hammerstone. 2. A tangential gesture was used in this experiment. 3. Well-struck flakes were easily produced. 4. Siret type knapping accidents were among the typically observed breakage patterns (Photos by J. Mestre).

Supplementary Figure 5: Bipolar knapping on an anvil. 1. A heavy, slightly rounded quadrangular hammerstone was used to extract flakes from a large rectangular block. 2. The intentional break is inclined and numerous accidentally produced fragments are associated with the blow (Photos by J. Mestre).

Supplementary Figure 6: Siret type accidents are typically produced when knapping Orce silicified limestone. Such products and/or their corresponding removal negatives are present in the archeological assemblages of Barranco León and Fuente Nueva 3 (Photos by J. Mestre).

Supplementary Figure 7: During experiments with both direct hammer and bipolar on an anvil percussion, two or more flakes were sometimes produced from a single blow (Photos by J. Mestre).

Supplementary Figure 8: Petrographic stratification within the limestone sometimes resulted in accidental parallel fractures. In the Barranco León and Fuente Nueva 3 assemblages, the edges of such fractures were sometimes used opportunistically; perhaps for cutting or chopping (Photos by J. Mestre).

Supplementary Figure 9: Splitting pebbles by throwing them resulted in typical fracture planes with clearly marked impact points on both fragments. These kinds of fractured fragments are typical in the of Barranco León and Fuente Nueva 3 archeological assemblages (Photos by J. Mestre).

Flint experiments

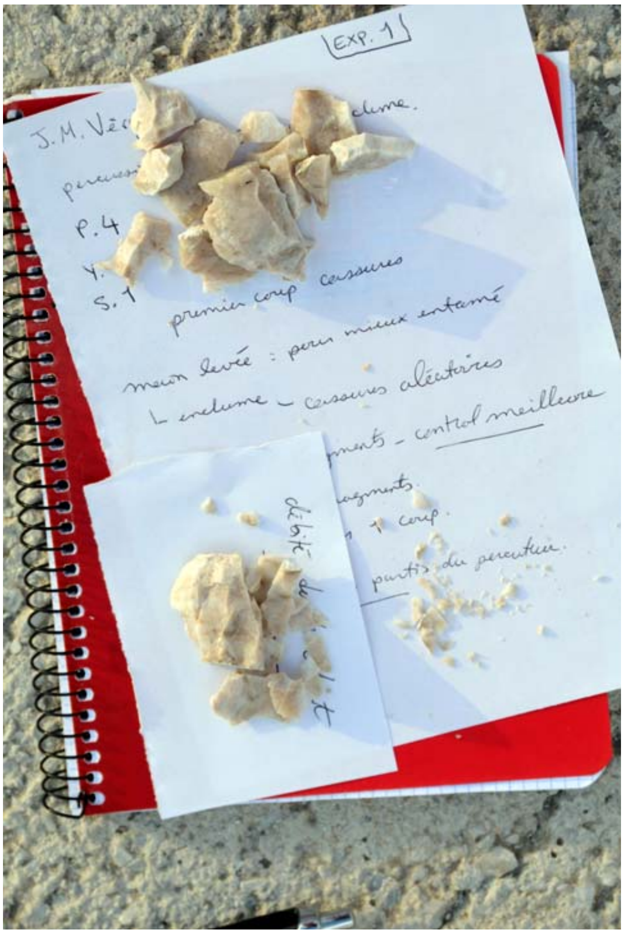
Controlled flint knapping was tested using both bipolar on an anvil and direct hammer percussion methods.

Supplementary Figure 10: Bipolar knapping on an anvil. Different kinds of flint were knapped on a large, flat anvil. This method is well-suited for reducing the small-sized flint nodules typically found around the Orce archeological sites. 1. A fist-sized rounded cobble was expediently knapped by bipolar on an anvil method. 2. Numerous well struck flakes were easily extracted from small flint nodules using this method. A large number of tiny fragments were inadvertently produced. Only the core preserves stigmata enabling to determine the use of bipolar on an anvil flaking (Photos by J. Mestre).

Supplementary Figure 11: Most of the flakes produced by the bipolar on an anvil method are indistinguishable from those extracted by direct hammer methods (Photos by J. Mestre).

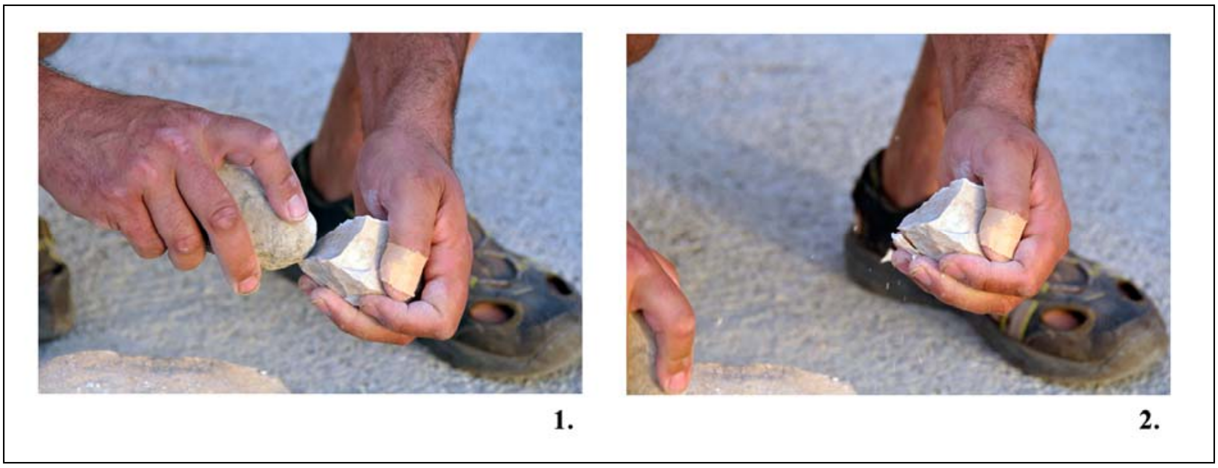
Supplementary Figure 12: Flakes and a core knapped by bipolar on an anvil method: more than one flake is often produced by a single blow (Photos by J. Mestre).

Supplementary Figure 13: Percussion marks localized on a pointed extremity of the limestone hammerstone used for bipolar on an anvil knapping experiments are analogous to some of those found on the of Barranco León and Fuente Nueva 3 limestone industries (Photos by J. Mestre).



Supplementary Figure 14: Variability of products resulting from flint core reduction using bipolar on an anvil method. Note the numerous tiny fragments (bottom right) (Photos by J. Mestre).

Supplementary Figure 15: Siret accidents commonly produced during bipolar on an anvil knapping experiments of Orce flint are abundant in the Barranco León and Fuente Nueva 3 archeological assemblages (Photos by J. Mestre).



Supplementary Figure 16: Direct hammer knapping of flint. 1. A small, rounded limestone hammerstone was effective for extracting flakes from a quadrangular flint core using a tangential gesture. 2. Flakes of various shapes and sizes were efficiently produced using this method; although flake breakage was common (Photos by J. Mestre).