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Supplementary Materials for

A 39,600-year-old leather punch board from Canyars, Gavà, Spain

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Supplementary Figures

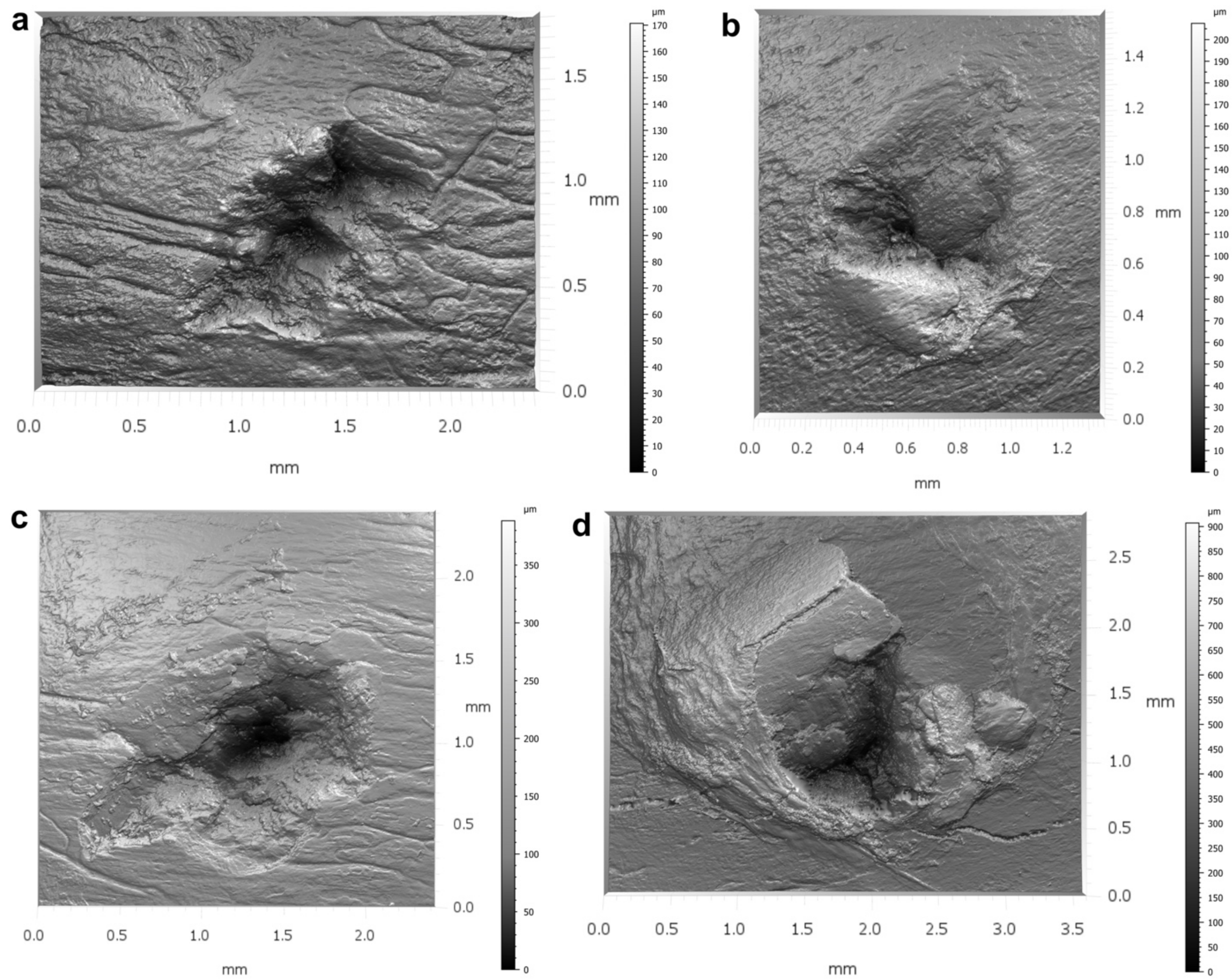

Fig. S1.

Experimental punctures made with a lithic retouched point (A, C) and a lithic burin (B, D) used in hand-held pressure (A–B) and in indirect percussion (C–D). In order to achieve depths similar to those recorded on the Canyars specimen, hand-held pressure must be combined with a wiggling movement which results in a rugged and jagged outline and internal morphology. Using lithic points in indirect percussion results in its systematic breakage and leaves secondary contact scratches on the bone surface. The use of burins in indirect percussion may cause the partial pealing of the bone lamellae around the punctures.

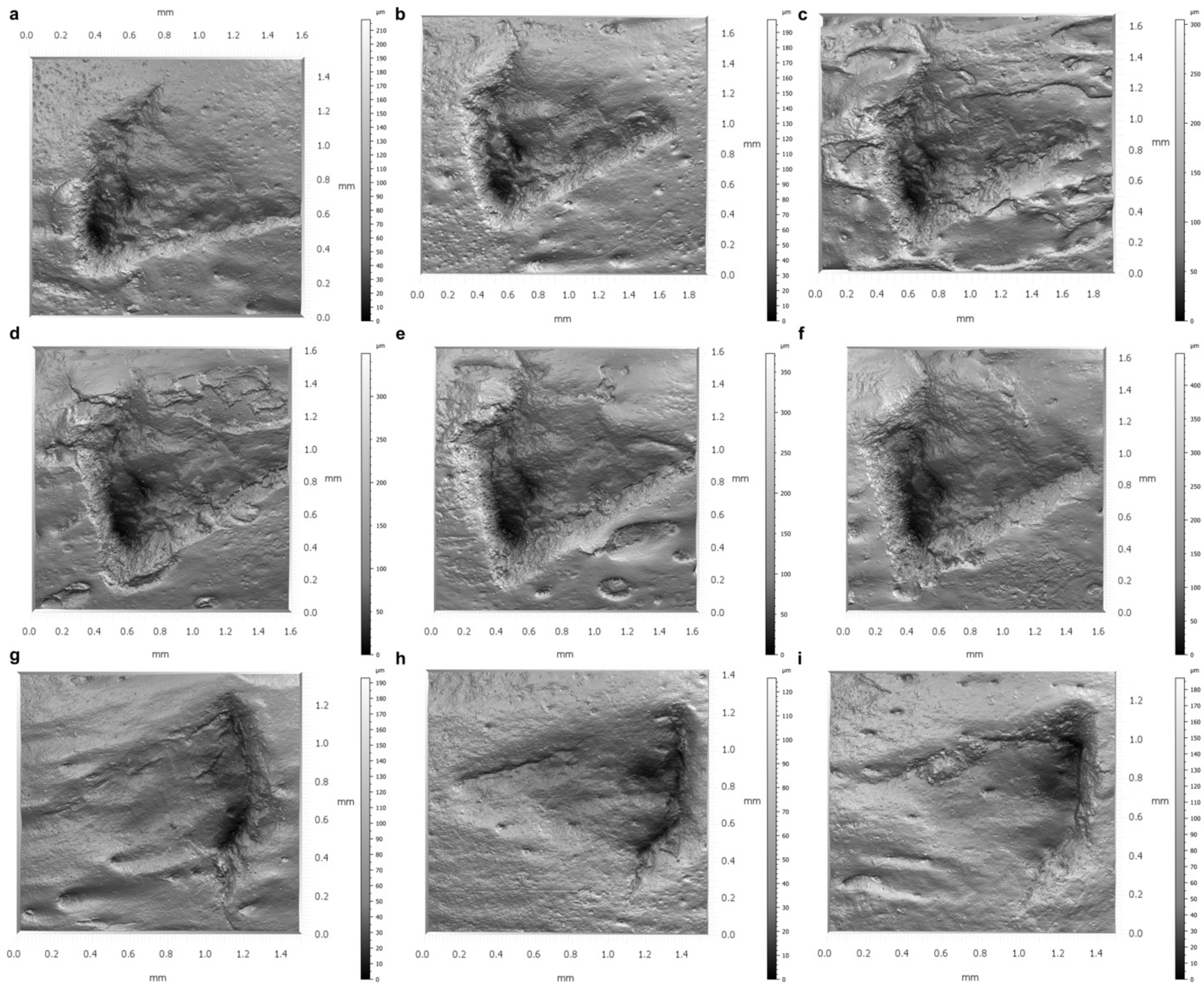

Fig. S2.

Series of punctures made in a single session with the same tool (A–F) by one individual in the second phase of our experiment. Nonadjacent punctures (G–I) made in two sessions with the same tool by the same individual on another surface of the *Bos taurus* short rib. Notice that despite change of the bone surface and interruptions between marking session, the same tool can be recognized from the punctures' outline and internal morphology.

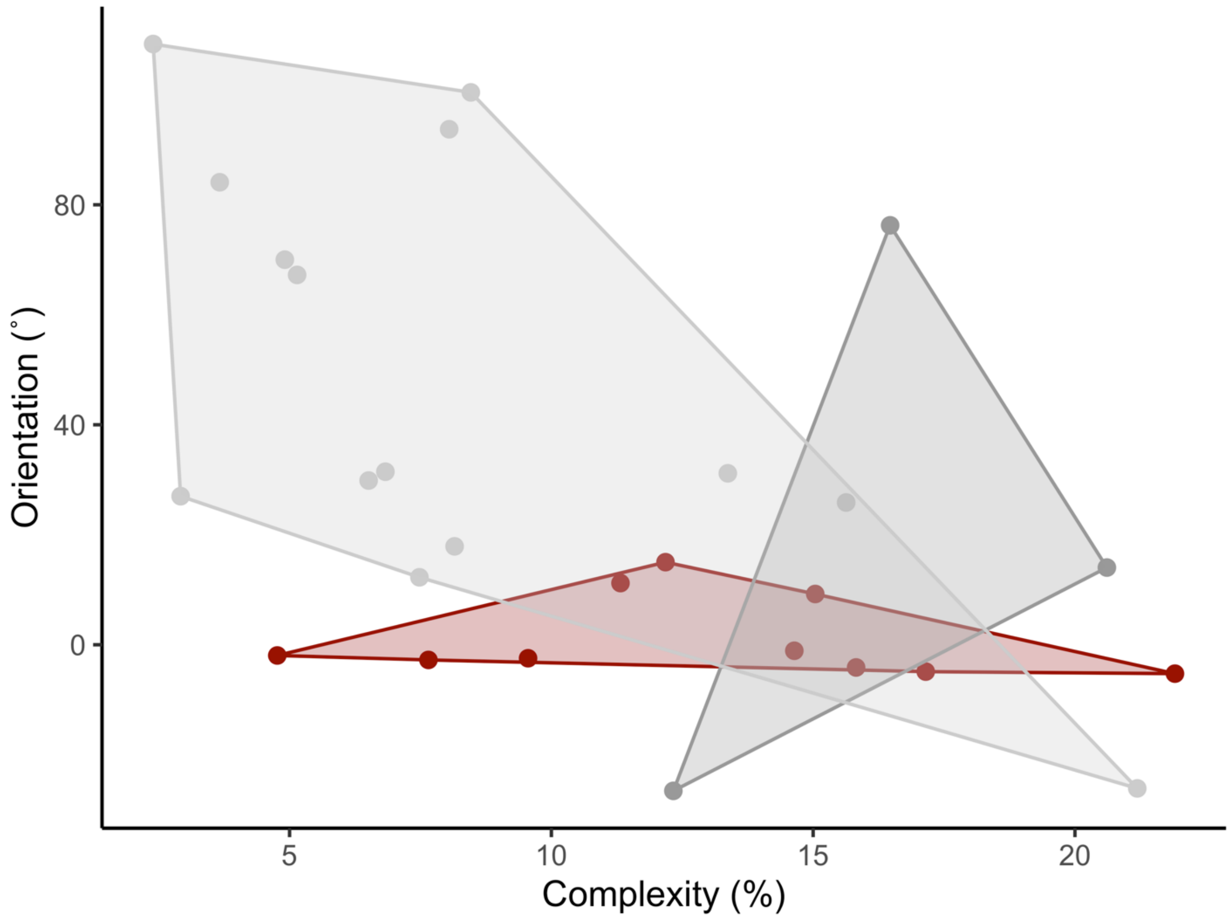

Fig. S3.

Scatterplot comparison of the Canyars punctures' orientation relative to the main axis of the object and their internal complexity, i.e., the variation between the planar and surface areas. Convex hulls represent set 1 (light gray), set 2 (red) and the three isolated punctures (dark gray). Set 2 shows substantially less variation in the punctures' orientation supporting that they were made in a single session. Variation in complexity is highly correlated to the punctures' depth (Fig. S4). See Table 1 for details.

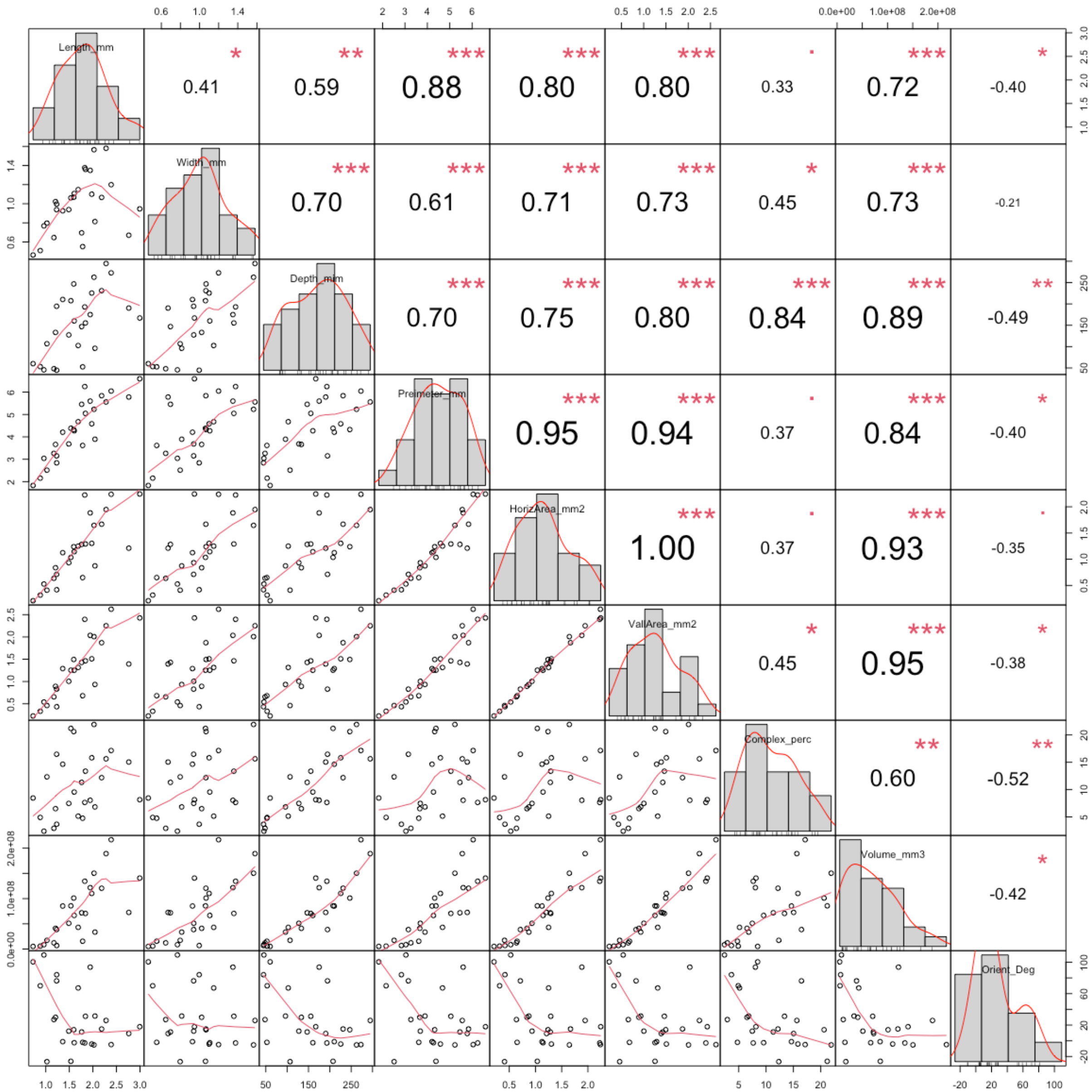

Fig. S4.

Correlation matrix of the punctures' metric parameters**.** Below the diagonal, scatterplots and trend lines for the values recorded for pairs of metric parameters. Above the diagonal, R^2 and significance, i.e., **: 0.001 > p ≤ 0.01, ***: p ≤ 0.001, for each pair of metric parameters. Along the diagonal, from top left to bottom right: Length (mm); Width (mm); Depth (μm); Perimeter (mm); Planar area (mm^2); Surface area (mm^2); Complexity (%); Volume (mm^3); Orientation (˚). Surface complexity corresponds to the percentage of variation between the planar and surface areas.

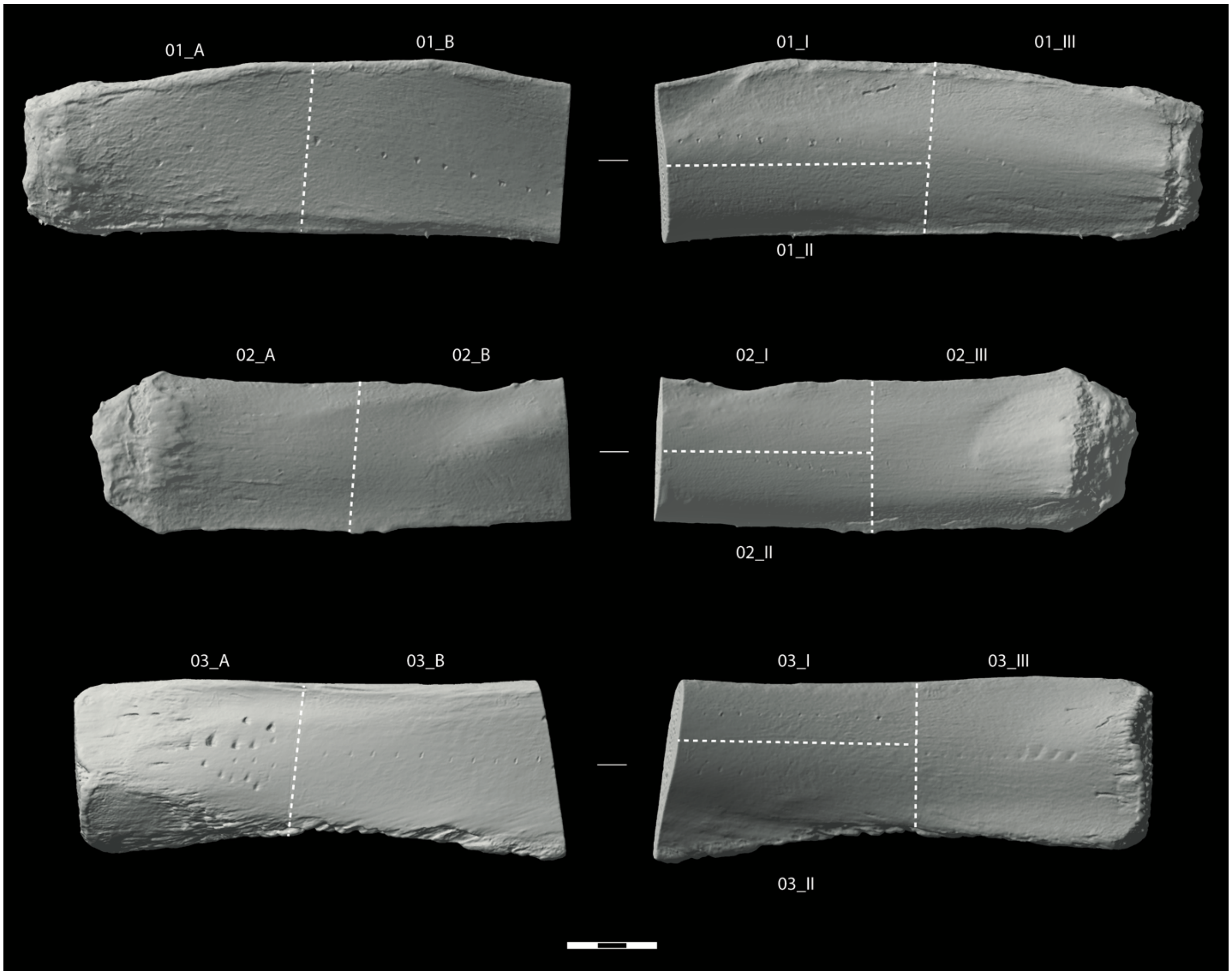

Fig. S5.
3D-models of the *Bos taurus* short ribs' surfaces punctured during the second phase of our experiment by the participant 1–3. Surface models were created with an Artec Spider 3D scanner. Area A was used to produce punctures and allow the participants to become familiar with the task. In area B, the participants were instructed to produce ten punctures. In area I, they had to produce a set of ten aligned punctures. In area II, they were asked to produce, ten aligned, equidistant, and identical punctures. In area III, the participants were provided with a paper gauge marked with ten dashes, spaced 5 mm from one another, and instructed to produce ten aligned, identical punctures matching the dashes on the gauge.

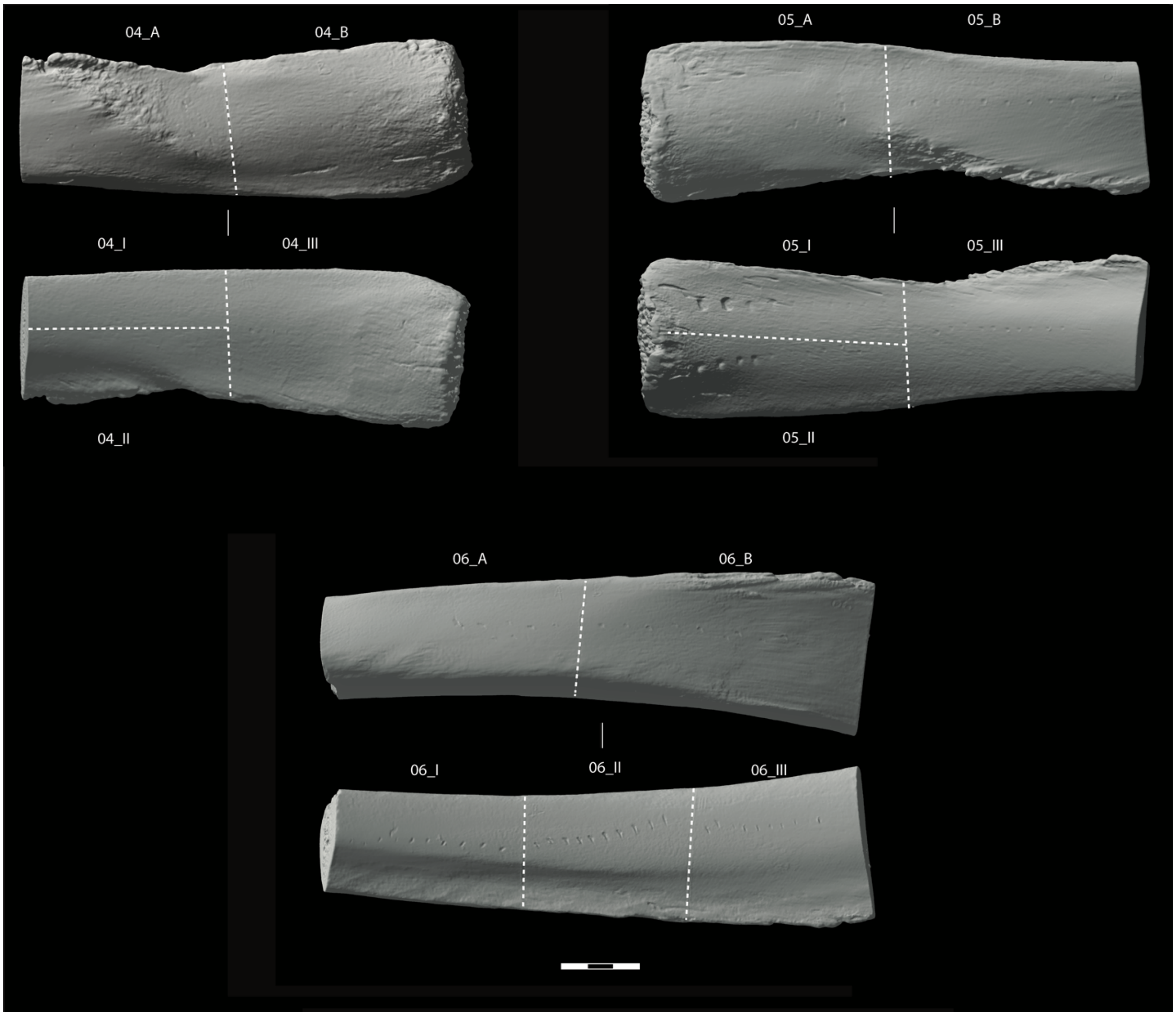

Fig. S6.

3D-models of the *Bos taurus* short ribs' surfaces punctured during the second phase of our experiment by the participant 4–6. Surface models were created with an Artec Spider 3D scanner. Area A was used to produce punctures and allow the participants to become familiar with the task. In area B, the participants were instructed to produce ten punctures. In area I, they had to produce a set of ten aligned punctures. In area II, they were asked to produce, ten aligned, equidistant, and identical punctures. In area III, the participants were provided with a paper gauge marked with ten dashes, spaced 5 mm from one another, and instructed to produce ten aligned, identical punctures matching the dashes on the gauge.

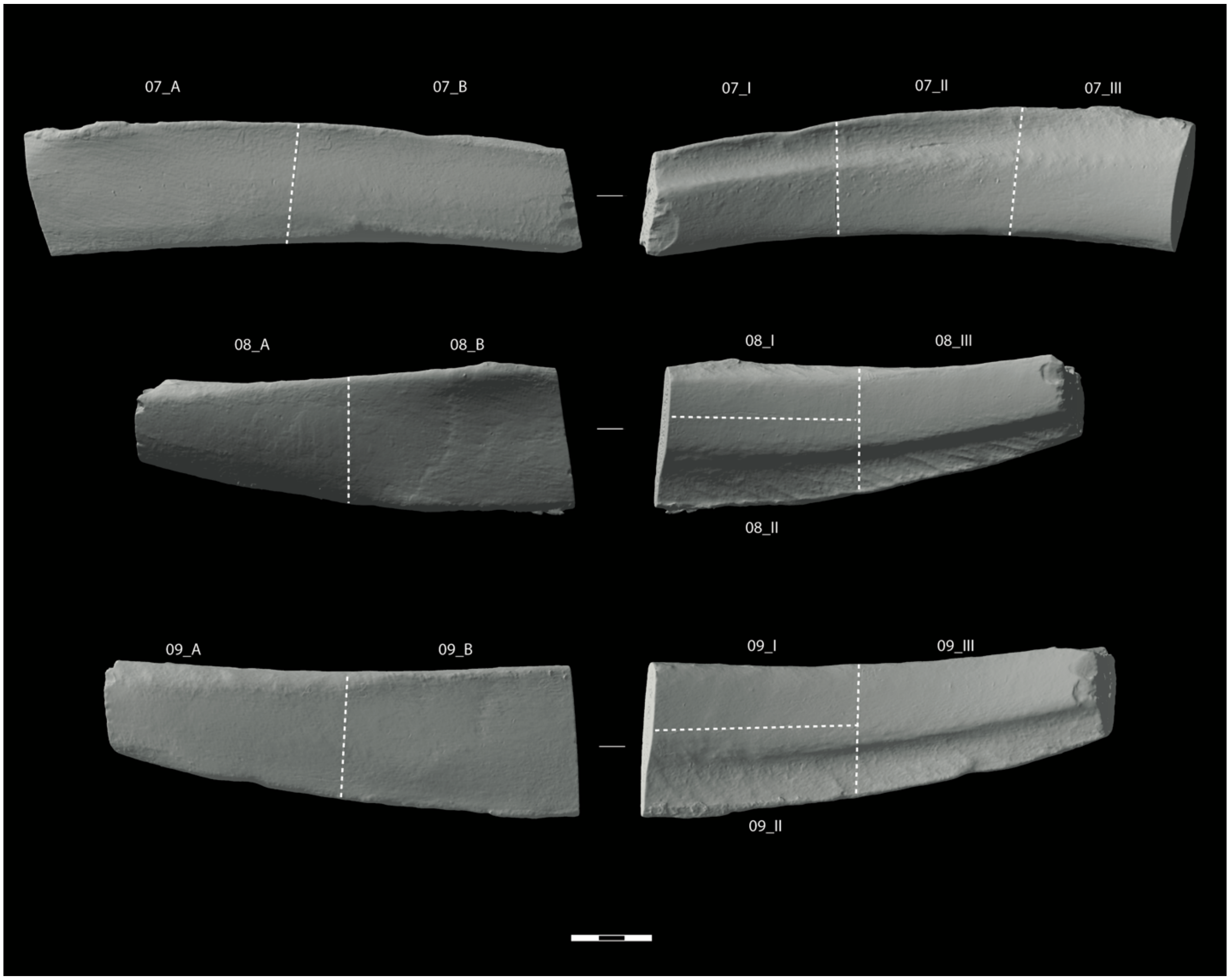

Fig. S7.

3D-models of the *Bos taurus* short ribs' surfaces punctured during the second phase of our experiment by the participant 7–9. Surface models were created with an Artec Spider 3D scanner. Area A was used to produce punctures and allow the participants to become familiar with the task. In area B, the participants were instructed to produce ten punctures. In area I, they had to produce a set of ten aligned punctures. In area II, they were asked to produce, ten aligned, equidistant, and identical punctures. In area III, the participants were provided with a paper gauge marked with ten dashes, spaced 5 mm from one another, and instructed to produce ten aligned, identical punctures matching the dashes on the gauge.

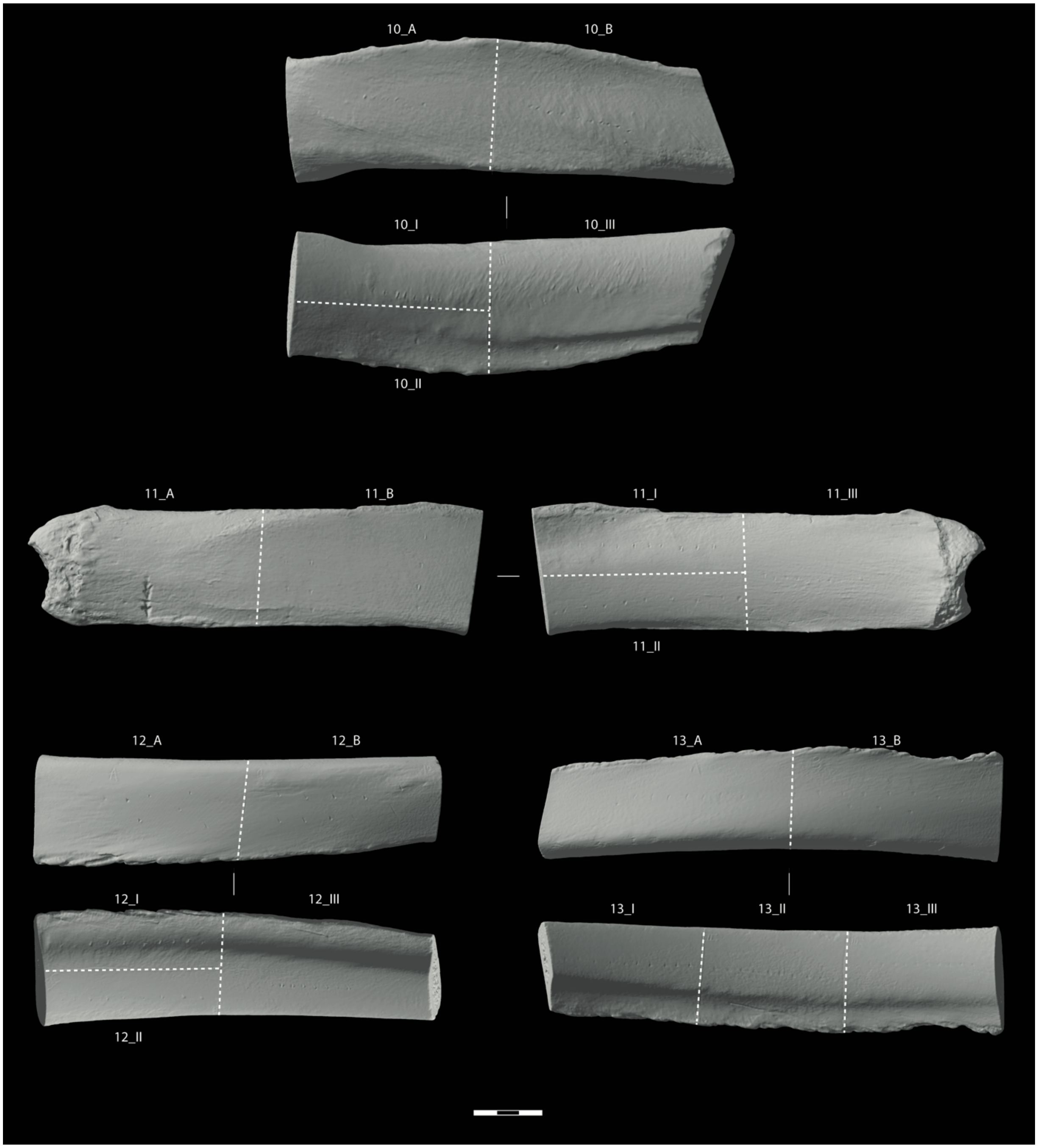

Fig. S8.

3D-models of the *Bos taurus* short ribs' surfaces punctured during the second phase of our experiment by the participant 10–13. Surface models were created with an Artec Spider 3D scanner. Area A was used to produce punctures and allow the participants to become familiar with the task. In area B, the participants were instructed to produce ten punctures. In area I, they had to produce a set of ten aligned punctures. In area II, they were asked to produce, ten aligned, equidistant, and identical punctures. In area III, the participants were provided with a paper gauge marked with ten dashes, spaced 5 mm from one another, and instructed to produce ten aligned, identical punctures matching the dashes on the gauge.

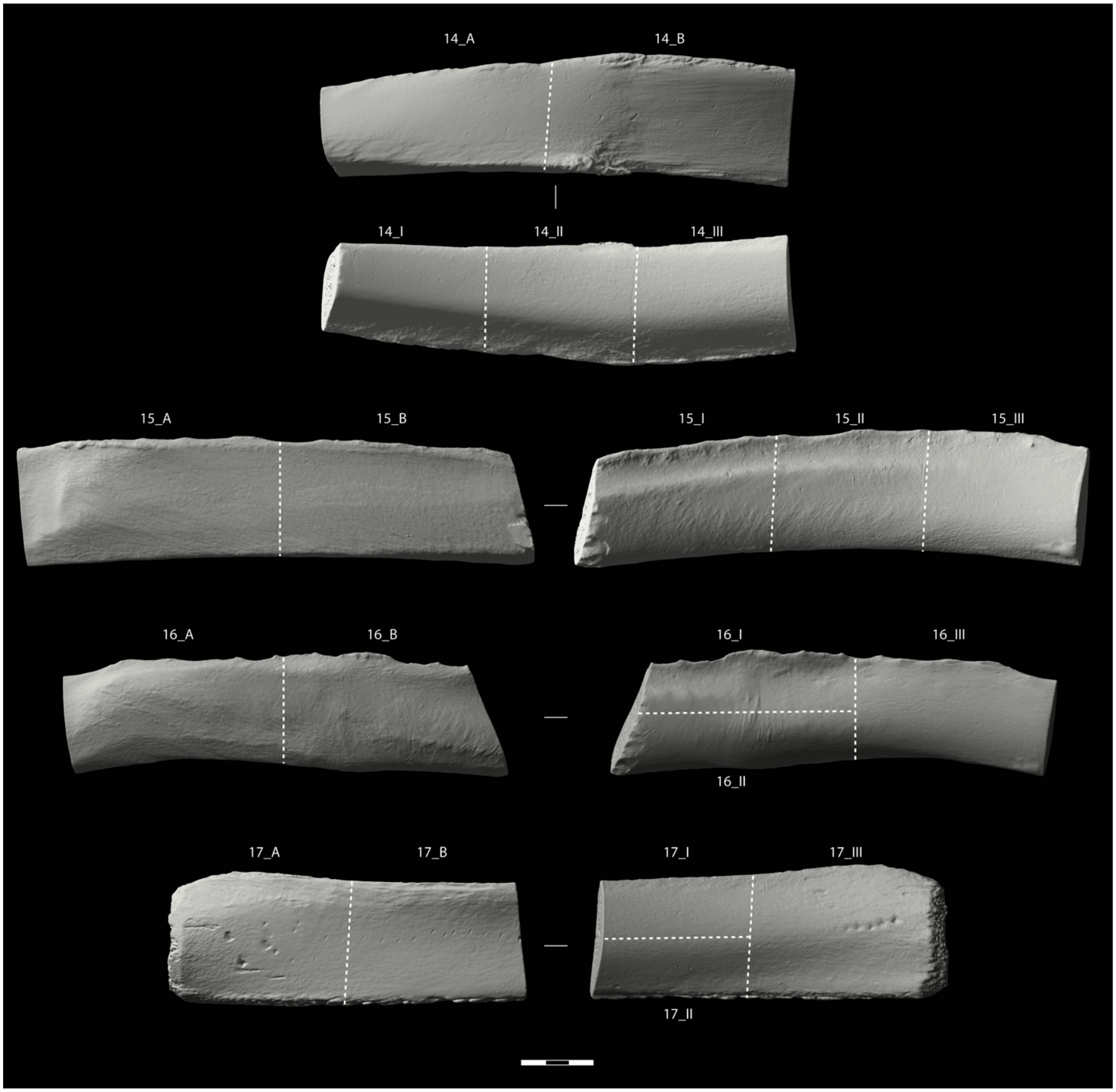

Fig. S9.

3D-models of the *Bos taurus* short ribs' surfaces punctured during the second phase of our experiment by the participant 14–17. Surface models were created with an Artec Spider 3D scanner. Area A was used to produce punctures and allow the participants to become familiar with the task. In area B, the participants were instructed to produce ten punctures. In area I, they had to produce a set of ten aligned punctures. In area II, they were asked to produce, ten aligned, equidistant, and identical punctures. In area III, the participants were provided with a paper gauge marked with ten dashes, spaced 5 mm from one another, and instructed to produce ten aligned, identical punctures matching the dashes on the gauge.