

# Online Resource 1

## **A method for the taphonomic assessment of bones tools using 3D surface texture analysis of bone microtopography**

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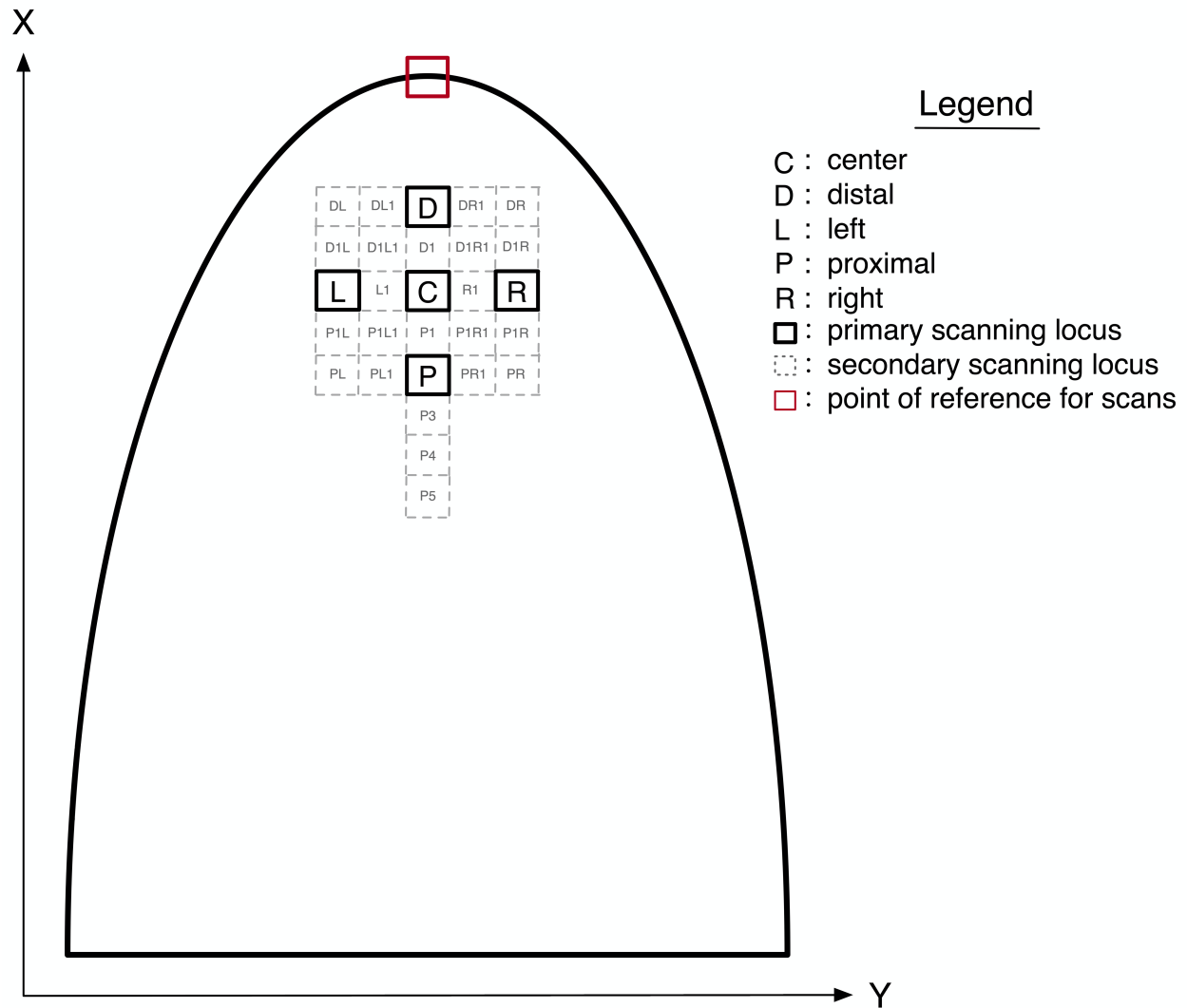
**Table S1** The artifacts and number of scans used for statistical modeling. Details include site (AP: Abri Peyrony, PA: Pech-de-l’Azé I), specimen ID, archaeological layer, type of surface scanned, and number of scans per artifact.

| Site | ID       | Level | Context           | Specimen Type        | Number of Usable Scans |
|------|----------|-------|-------------------|----------------------|------------------------|
| AP   | 2050a    | L-3B  | Screened material | Mold of rib fragment | 2                      |
| AP   | 2050b    | L-3B  | Screened material | Mold of rib fragment | 2                      |
| AP   | 2050c    | L-3B  | Screened material | Mold of rib fragment | 2                      |
| AP   | 2166     | L-3A  | Piece-plotted     | Mold of rib fragment | 4                      |
| AP   | 2742     | L-3B  | Piece-plotted     | Mold of rib fragment | 3                      |
| AP   | 3468a    | L-3B  | Screened material | Mold of rib fragment | 4                      |
| AP   | 3468b    | L-3B  | Screened material | Mold of rib fragment | 4                      |
| AP   | 3791     | L-3A  | Screened material | Mold of rib fragment | 2                      |
| AP   | 4493b    | L-3B  | Screened material | Mold of rib fragment | 2                      |
| AP   | 4922a    | L-3B  | Screened material | Mold of rib fragment | 5                      |
| AP   | 5645     | L-3B  | Screened material | Mold of rib fragment | 1                      |
| AP   | 6071     | L-3B  | Piece-plotted     | Mold of rib fragment | 3                      |
| AP   | 6347     | L-3B  | Piece-plotted     | Mold of rib fragment | 2                      |
| PA I | G8-1116a | 4     | Screened material | Mold of rib fragment | 5                      |
| PA I | G8-1116b | 4     | Screened material | Mold of rib fragment | 3                      |
| PA I | G8-1291b | 4     | Screened material | Mold of rib fragment | 6                      |
| PA I | G8-1386a | 4     | Screened material | Mold of rib fragment | 4                      |
| PA I | G8-1386b | 4     | Screened material | Mold of rib fragment | 3                      |
| PA I | G8-1453b | 4     | Screened material | Mold of rib fragment | 4                      |
| PA I | I1-4274b | II-4  | Screened material | Mold of rib fragment | 5                      |
| AP   | 10818    | L-3B  | Screened material | <i>Lissoir</i>       | 2                      |
| AP   | 4209     | L-3A  | Screened material | <i>Lissoir</i>       | 3                      |
| AP   | 4493     | L-3B  | Screened material | <i>Lissoir</i>       | 5                      |
| AP   | 7839     | L-3B  | Piece-plotted     | <i>Lissoir</i>       | 7                      |
| PA I | G8-1417  | 4     | Screened material | <i>Lissoir</i>       | 2                      |

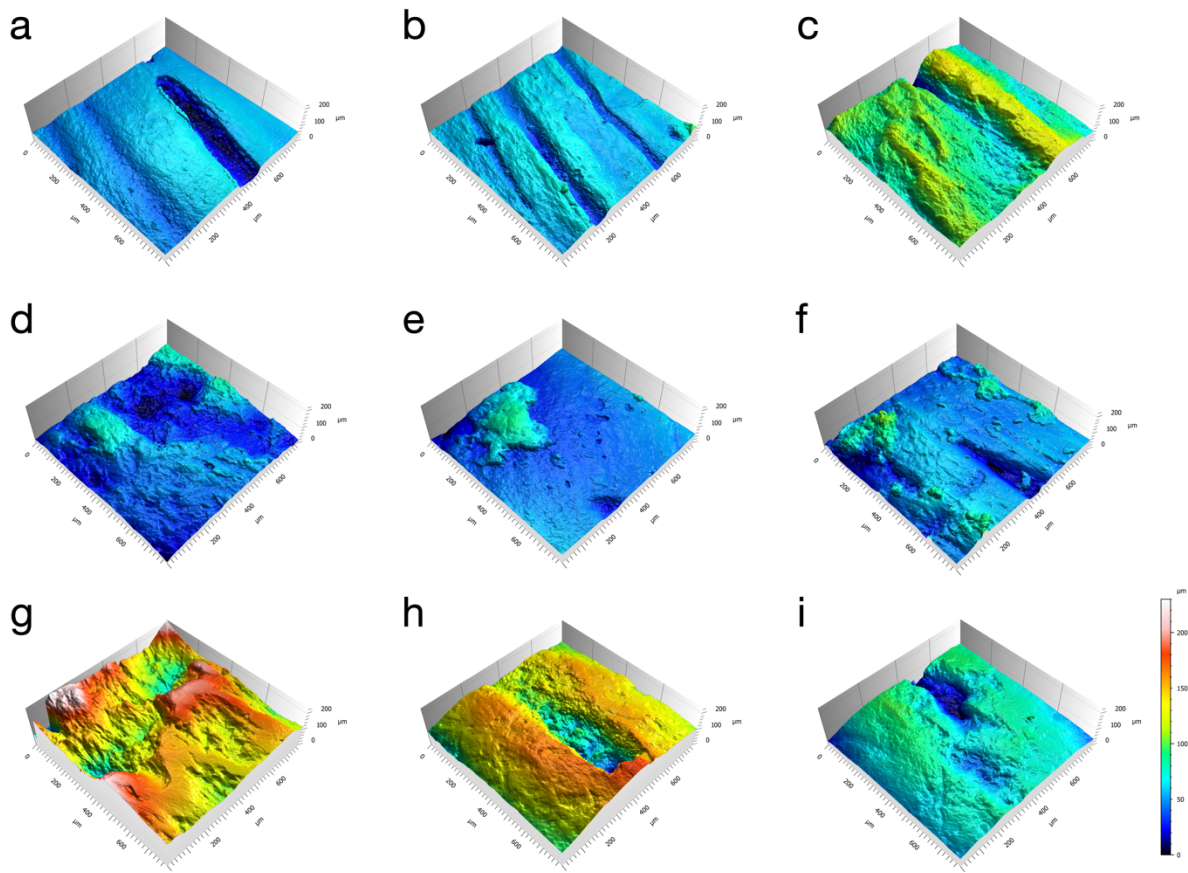
**Table S2** The modern bone specimens and number of unique scans used for statistical modeling.

Details include specimen ID, type of surface scanned, and number of scans per artifact.

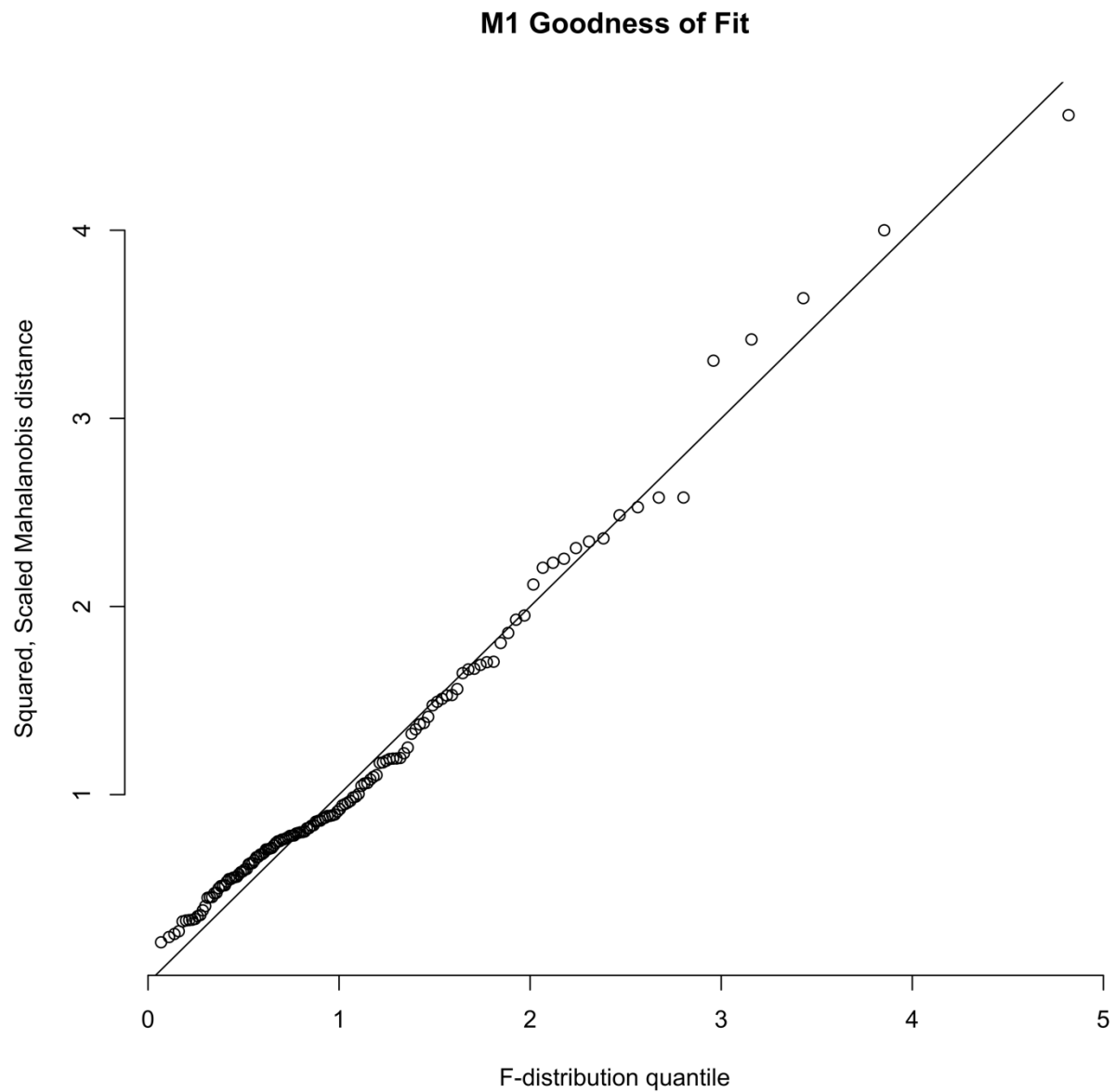
| ID   | Specimen Type        | Number of Usable Scans |
|------|----------------------|------------------------|
| V3   | Mold of rib fragment | 3                      |
| V5   | Mold of rib fragment | 2                      |
| VI4  | Mold of rib fragment | 9                      |
| VI5  | Mold of rib fragment | 3                      |
| VI6  | Mold of rib fragment | 9                      |
| VII1 | Mold of rib fragment | 8                      |
| VII2 | Mold of rib fragment | 8                      |
| VII3 | Mold of rib fragment | 9                      |



**Fig. S1** Example of sampling method used for obtaining surface texture scans on the rib fragments and *lissoir* tips at locations C (center), D (distal), P (proximal), L (left), and R (right). Additional scanned locations are represented by dashed boxes. All scanned areas are 0.8mm<sup>2</sup> but are enlarged here for readability.



**Fig. S2** Examples of meshed axiomatic 3D models excluded from statistical modeling due to large features that would skew towards capturing the variation of the bone structure and not the effects indicative of anthropogenic alterations; (a-b) modern unworked rib fragments with large trenches that may have been formed during periosteum removal; (c-e) ancient unworked rib fragments with varying degrees of their original surfaces preserved; (f-i) ancient *lissoir* fragments with irregular surface preservation (f-g) and large craters (h-i). Scans originate from the following specimens: (a) V5; (b) V4; (c) PA I G8-1453b; (d) AP-2050b; (e) AP-2050c; (f) AP-7839; (g) PA I G8-1417; (h) AP-10818; (i) AP-4493. Color of surfaces correspond to height on the z-axis in lower right-hand corner.



**Fig. S3** Quantile-quantile plot of scaled and squared Mahalanobis distances. Mahalanobis distances (between observations and their predicted values) versus theoretical quantiles of the F-distribution (Roth 2013). The majority of observations follow the theoretical quantiles well.

## References

Roth M (2013) On the multivariate t distribution Linköping University Electronic Press