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Gómez-Olivencia, A, Quam, R, Sala, N, Bardey, M, Ohman, JC and Balzeau, A<br>La Ferrassie 1: New perspectives on a "classic" Neandertal.

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## Article

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SOM Figure S1. Cross-section of the right temporal bone of La Ferrassie 1 Neandertal showing the position of the three ear ossicles and their 3D virtual reconstructions.


SOM Figure S2. Cumulative percentage of the minimum number of anatomical units (MNAU), i.e., number of bones or bone portions preserved in a sample divided by number of that bone or bone portion in a complete skeleton, present in La Ferrassie 1 (blue dots) compared to what would be expected in a complete skeleton (orange line; see SOM Table S1).


SOM Figure S3. Dorsal view of the cast of the right femur of the Feldhofer Neandertal (left) with the right femur of the La Ferrassie 1 Neandertal. Note the difference in the size and location of the greater trochanter (arrow with ${ }^{* *}$ ). Note also the exostosis present in the trochanteric fossa (arrow with *).


SOM Figure S4. Left ulna of the La Ferrassie 1 Neandertal skeleton: original bone and 3D reconstruction in ventral (anterior) views (left half of the image) and longitudinal section and detail of the section from the CT-scan showing two natural bone fractures with angles close to $90^{\circ}$ (right half of the image).


SOM Figure S5. Cranio-caudal and dorso-ventral x-rays of the clavicles of La Ferrassie 1. Note the difference in the trabecular organization in the shaft, which is more irregular in the left clavicle (arrows).

## SOM Table S1

Anatomical representation (absolute and relative) of the La Ferrassie 1 individual and cumulative percentage.

| Anatomical region | NISP | NME | $\mathbf{N a}^{\mathbf{0}} \mathbf{A U}$ | One skeleton | MNAU | Relative <br> MNAU | $\begin{aligned} & \text { Cumulative \% } \\ & \text { MNAU } \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Cranium | >25 | 1 | 1 | 1 | 1.00 | 3.41 | 3.41 |
| Mandible | 6 | 1 | 1 | 1 | 1.00 | 3.41 | 6.83 |
| Teeth | 32 | 32 | 32 | 32 | 1.00 | 3.41 | 10.24 |
| Cerv. vertebrae | 7* | 7 | 7 | 7 | 1.00 | 3.41 | 13.65 |
| Thor. vertebrae | 18* | 11 | 11 | 12 | 0.92 | 3.13 | 16.78 |
| Lumb. vertebrae | 9* | 5 | 5 | 5 | 1.00 | 3.41 | 20.19 |
| Os coxae | 3 | 2 | 2 | 2 | 1.00 | 3.41 | 23.61 |
| Sacrum | 3 | 1 | 1 | 1 | 1.00 | 3.41 | 27.02 |
| Coccyx | 1 | 1 | 1 | 2 | 0.50 | 1.71 | 28.73 |
| Ribs | 43* | $22^{* *}$ | 22 | 24 | 0.92 | 3.13 | 31.85 |
| Claviculae | 5 | 2 | 2 | 2 | 1.00 | 3.41 | 35.27 |
| Scapulae | 7 | 2 | 2 | 2 | 1.00 | 3.41 | 38.68 |
| Humerus | 3 | 2 | 2 | 2 | 1.00 | 3.41 | 42.09 |
| Ulnae | 4 | 2 | 2 | 2 | 1.00 | 3.41 | 45.51 |
| Radii | 3 | 2 | 2 | 2 | 1.00 | 3.41 | 48.92 |
| Scaphoids | 1 | 1 | 1 | 2 | 0.50 | 1.71 | 50.63 |
| Lunates | 0 | 0 | 0 | 2 | 0.00 | 0.00 | 50.63 |
| Triquetrals | 1 | 1 | 1 | 2 | 0.50 | 1.71 | 52.33 |
| Pisiforms | 0 | 0 | 0 | 2 | 0.00 | 0.00 | 52.33 |
| Trapeziums | 2 | 2 | 2 | 2 | 1.00 | 3.41 | 55.75 |
| Trapezoids | 2 | 2 | 2 | 2 | 1.00 | 3.41 | 59.16 |
| Capitates | 1 | 1 | 1 | 2 | 0.50 | 1.71 | 60.86 |
| Hamates | 1 | 1 | 1 | 2 | 0.50 | 1.71 | 62.57 |
| Metacarpals | 16 | 10 | 10 | 10 | 1.00 | 3.41 | 65.98 |
| Hand phalanges | 19 | 18 | 18 | 28 | 0.64 | 2.19 | 68.18 |
| Femora | 6 | 2 | 2 | 2 | 1.00 | 3.41 | 71.59 |
| Patellae | 0 | 0 | 0 | 2 | 0.00 | 0.00 | 71.59 |
| Tibiae | 4 | 2 | 2 | 2 | 1.00 | 3.41 | 75.00 |
| Fibulae | 5 | 2 | 2 | 2 | 1.00 | 3.41 | 78.42 |
| Tali | 2 | 2 | 2 | 2 | 1.00 | 3.41 | 81.83 |
| Calcanei | 2 | 2 | 2 | 2 | 1.00 | 3.41 | 85.24 |
| Cuboids | 1 | 1 | 1 | 2 | 0.50 | 1.71 | 86.95 |
| Cuneiforms I | 2 | 2 | 2 | 2 | 1.00 | 3.41 | 90.36 |
| Cuneiforms II | 1 | 1 | 1 | 2 | 0.50 | 1.71 | 92.07 |
| Cuneiforms III | 1 | 1 | 1 | 2 | 0.50 | 1.71 | 93.78 |
| Naviculars | 1 | 1 | 1 | 2 | 0.50 | 1.71 | 95.48 |
| Metatarsals | 15 | 10 | 10 | 10 | 1.00 | 3.41 | 98.89 |
| Pedal phalanges | 10 | 9 | 9 | 28 | 0.32 | 1.10 | 100.00 |

Abbreviations: NISP = Number of Identified Specimens, MNE = Minimum Number of Elements, MNAU $=$ Minimum Number of Anatomical Units, Cumulative $\% \mathrm{MNAU}=$ Cumulative percentage of the minimum number of anatomical units.

* The vertebrae and ribs are very fragmented. Here we indicate the NISP after all the possible refits were performed.
** Gómez-Olivencia, unpublished data.

SOM Table S2
Comparative sample of ear ossicles used in the present study.

| Specimen/Group | Malleus | Incus | Stapes | Oval window | Source |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Middle Pleistocene Europe |  |  |  |  |  |
| AT-84 |  |  |  | X | Martínez et al., 2004 |
| AT-421 |  |  |  | X | Martínez et al., 2004 |
| AT-667 (Cranium 5) |  |  | X | X | Martínez et al., 2004 |
| AT-3746+3747 | X | X |  |  | Martínez et al., 2004 |
| Ehringsdorf H1026 | X | X |  | X | Stoessel et al., 2016a |
| Biache-Saint-Vaast 1 | X | X |  |  | Lisoněk and Trinkaus, 2006; Crevecoeur, 2007 |
| Neandertals |  |  |  |  |  |
| La Ferrassie 1 | X | X | X |  | This study |
| La Ferrassie 3 | X | X | X | X | Quam et al., 2013b |
| La Ferrassie 4 bis |  |  |  | X | Quam et al., 2013b |
| La Ferrassie 5 |  |  |  | X | Quam et al., 2013b |
| La Ferrassie 8 |  |  | X |  | Gómez-Olivencia et al., 2015 |
| Subalyuk 2 |  |  | X |  | Quam et al., 2013b |
| Amud 7 |  | X |  |  | Quam and Rak, 2008 |
| Arcy-sur-Cure |  |  |  | X | Quam et al., 2013b |
| Kebara 1 |  |  |  | X | Quam et al., 2013b |
| Neandertal sample | ( $n=4$ ) | ( $n=10$ ) | ( $n=5$ ) | ( $n=13$ ) | Stoessel et al., 2016a |
| Fossil H. sapiens |  |  |  |  |  |
| Qafzeh 3 |  |  |  | X | Quam et al., 2013b |
| Qafzeh 11 | X | X |  | X | Quam and Rak, 2008; Quam et al., 2013b |
| Qafzeh 12 | X | X |  | X | Quam and Rak, 2008; Quam et al., 2013b |
| Qafzeh 13 |  |  |  | X | Quam et al., 2013b |
| Qafzeh 15 | X | X |  |  | Quam and Rak, 2008 |
| Qafzeh 21 |  | X |  | X | Quam and Rak, 2008; Quam et al., 2013b |
| Skhul 1 |  |  |  | X | Quam et al., 2013b |
| Border Cave 3 |  |  |  | X | Quam et al., 2013b |
| Nazlet Khater 2 | X |  |  |  | Crevecoeur, 2007 |
| Pestera cu Oase 2 | X |  | X |  | Ponce de León and Zollikofer, 2013 |
| Dolní Věstonice 14 | X | X |  |  | Lisoněk and Trinkaus, 2006; Quam and Rak, 2008 |
| Dolní Věstonice 15 |  | X |  |  | Lisoněk and Trinkaus, 2006; Quam and Rak, 2008 |
| Cro-Magnon 1 | X | X | X |  | Stoessel et al., 2016a |
| Cro-Magnon 2 |  |  |  | X | Quam et al., 2013b |
| Abri Pataud 1 | X | X |  |  | Stoessel et al., 2016a |
| Lagar Velho 1 | X | X |  |  | Quam and Rak, 2008 |


| Parpalló 1 |  |  |  | X | Quam et al., 2013b |
| :---: | :---: | :---: | :---: | :---: | :--- |
| Recent $H$. sapiens | $(n=43)$ | $(n=43)$ | $(n=40)$ |  | Quam and Rak, 2008; Quam et al., 2013b |

## SOM Table S3

Measurement protocol for the malleus.

| No. | Definition | Description |
| :--- | :--- | :--- |
| Orientation | Bone is lying on its posterior aspect (with the articular facet away <br> from the observer) and with the manubrium parallel to the plane of <br> projection, i.e., flat on the surface. |  |
|  | Y-axis (Head/neck axis) | Defined by a line connecting the midpoint of the minimum neck <br> width and the most salient point along the top of the head. This is a <br> slightly different definition than that of Masali (see text). |
| axis) |  |  |

## SOM Table S4

Measurement protocol for the incus.

| No. | Definition | Description |
| :---: | :---: | :---: |
|  | Orientation | Bone is lying on its medial aspect. In this orientation, more of the articular facet is visible and the lowest point of the articular facet is marked by a 'lip' |
|  | X -axis (Long process axis) | Defined by a line joining the tip of the long process to the most salient point along the superior border of the body. |
|  | Y-axis (Short process axis) | Defined by a line joining the tip of the short process to the most salient point along the anterior portion of the superior border of the body. |
|  | Z-axis (Rotational axis) | Defined by a line joining the tip of the short process to the most external point along the margin of the articular facet. This axis approximates the rotational axis of the incus within the tympanic cavity. |
| 9 | Short process length | Maximum distance from the tip of the short process to the most salient point along the anterior portion of the superior border of the body, following the Y-axis. |
| 10 | Long process length | Maximum distance from the tip of the long process to the most salient point along the superior border of the body. |
| 11 | Articular facet height | Maximum height of the articular facet taken perpendicular to the Zaxis. |
| 12 | Functional length | Maximum distance from the tip of the long process to the Z -axis, taken perpendicular to the Z-axis. |
| 13 | Arc depth of the long process | Maximum depth of the arc along the long process, measured from the plane defined by the lateralmost edge of the articular facet and the lateralmost point along the tip of the long process. |
| 14 | Inter-process length | Maximum distance between the most salient points along the superior margin of the short process and the tip of the long process. The lateralmost points of the short and long process tips define the measurement plane. |
| 15 | Inter-process arc depth | Maximum depth of the curvature between the short and long crurae tips. The depth is taken perpendicular to the axis defined above for the intercrural length (No. 14). |
| 16 | Angle between the axes | Angle formed between the X - and Y -axes. |
|  | Crural index | $($ Short process length/long process length) $\times 100$ |

## SOM Table S5

Measurement protocol for the stapes.

| No. | Definition | Description |
| :---: | :---: | :---: |
|  | Bone orientation | Bone is lying flat on the surface with the convex (round) side turned toward the observer. This is the "norma craniale" orientation of Masali. |
|  | X -axis (Anterior crus axis) | Defined by a line joining the antero-superior corner of the footplate and the tip of the head. |
|  | Y-axis (Posterior crus axis) | Defined by a line joining the postero-superior corner of the footplate and the tip of the head. |
|  | Z-axis (Footplate axis) | Defined by a line joining the most inferior points along the footplate margin anteriorly and posteriorly. |
| 19 | Total height of the Stapes | Maximum height from the lower margin of the footplate to the tip of the head, taken perpendicular to the Z -axis. |
| 20 | Head height | Minimum distance between the superior margin of the obturator foramen and the top of the head, taken perpendicular to the Z -axis. The latter point is defined as for total staps height (No. 19). |
| 21 | Obturator foramen height | Maximum height of the obturator foramen taken perpendicular to the Z-axis. |
| 22 | Obturator foramen width | Maximum width of the obturator foramen taken parallel to the Z-axis. |
| 24 | Posterior crus length | Maximum distance from the postero-superior corner of the footplate to the tip of the head, following the Y -axis. |
| 26 | Anterior crus length | Maximum distance from the antero-superior corner of the footplate to the tip of the head, following the X -axis. |
| 28 | Angle A | Angle between the anterior and posterior crurae, or between the Xand Y-axes. |
| 29 | Angle B | Angle between the anterior crus and the footplate, or between the Xand Z-axes. |
| 30 | Angle C | Angle between the posterior crus and the footplate, or between the Yand Z-axes. |
| 31 | Footplate length | Maximum length of the footplate. |
| 32 | Footplate width | Maximum width of the footplate, not necessarily perpendicular to the length. |
| 33 | Footplate area | Measured area of the footplate. |
|  | Stapedial index | (Footplate length/height of the stapes) $\times 100$ |
|  | Obturator foramen index | (Obturator foramen width/obturator foramen height) $\times 100$ |
|  | Foot plate index | (Footplate width/footplate length) $\times 100$ |
|  | Crural index | (Anterior crus length/posterior crus length) $\times 100$ |

SOM Table S6
Coding for the presence and degree of development of the pathological lesions of the surfaces and edges of both the vertebral body and articular facets ${ }^{\text {a }}$.

| Anatomical region | Code | Description |
| :--- | ---: | :--- |
| Subchondral bone (articular facets) | 0 | Normal |
|  | 1 | Porosity |
|  | 2 | Eburnation, destruction of the <br> subchondral surface (porosity), or fusion |
| Osteophytic lipping (vertebral body and <br> articular surfaces) | 0 | None |
|  | 1 | Trace ( $<1 \mathrm{~mm})$ |
|  | 2 | Moderate $(<4 \mathrm{~mm})$ |
| Intervertebral disc surfaces (vertebral <br> bodies) | 3 | Major ( $>4 \mathrm{~mm})$ |
|  | 1 | Good condition |
|  | 2 | Pchmorl's node, destruction of the <br> subchondral surface (porosity), or <br> eburnation. |

${ }^{\mathrm{a}}$ Following Dawson and Trinkaus (1997), modified from Bridges (1994).

## SOM Table S7

La Ferrassie 1 vertebral pathology from the elements kept in Box 37.

|  | Anatomical position | C1 | C2 | C3 | C4 | C5 | C6 | C7 | T1 | T2 | T3 | T4? | $\begin{aligned} & \hline \text { T5- } \\ & \text { T11 } \\ & \hline \end{aligned}$ | T4? | T9? | $\begin{aligned} & \hline \text { T5- } \\ & \text { T8 } \end{aligned}$ | $\begin{aligned} & \hline \text { T5- } \\ & \text { T8 } \end{aligned}$ | T12 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Label* | \#a | \#b <br> (2) | \#d <br> (3) | \#c <br> (4) | \#e <br> (5) | \#f <br> (6) | \#g <br> (7) | $\begin{aligned} & \text { \#h } \\ & (8) \end{aligned}$ | $\begin{aligned} & \# 1 \\ & (9) \end{aligned}$ | $\begin{gathered} \# \mathrm{j} \\ (10) \end{gathered}$ | \#k1 | \#k2 | $\begin{gathered} \# \mathrm{k} 3 \\ +\# \mathrm{k} \\ 4+\# \\ \mathrm{k} 5 \end{gathered}$ | $\begin{gathered} \# \mathrm{p} \\ (13) \end{gathered}$ | \#m | \#q | \#r |
|  | Right surface | 0 | 0 | 0 | 0 | 0 | 0 | 0 ? | 0 ? | 0 | X |  |  |  |  |  | 0 | X |
| Cranial | Right margin | 0 ? | X | 2 | 2 | 1 | 1 | X | 2 | 2 | X |  |  |  |  |  | X | X |
|  | Left surface | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 |  |  |  | X | X |
|  | Left margin | 0 ? | 1 ? | 2 | 2 | 2 | 2 | 1 | 2 | 2 | X |  | 1 |  |  |  | X | X |
|  | Right surface | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |  |  |  | 0 | X |
| Caudal | Right margin | X | 2 | 2 | 2 | 2 | 2 | 2 | X | 1 | X |  |  |  |  |  | X | X |
|  | Left surface | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | X |  |  | 1 | 0 |  | 0 | 0 |
|  | Left margin | 1 | 3 | 1 | 2 | 2 | 1 | 1 | X | X | X |  |  | 1 | 1 |  | X | $2 ?$ |
|  | Surface | - | - | 0 | 0 | 0 | 0 | X | X | 0 | X | 0 ? |  |  |  | X | X | 0 ? |
|  | Ventral | - | - | $1 ?$ | X | X | X | X | X | X | X | X |  |  |  | X | X | X |
| Cranial body | Dorsal | - | - | 0 | 0 | X | 0 | X | X | X | 0 ? | 0 |  |  |  | 1 | X | X |
|  | Right | - | - | $1 ?$ | X | X | X | X | X | X | X | X |  |  |  | X | X | X |
|  | Left | - | - | $1 ?$ | X | 0 | $1 ?$ | X | X | X | X | X |  |  |  | X | X | 0 |
|  | Surface | - | 0 | 0 | 0 | 0 | 0 | 0 ? | 0 | 0 | 0 ? | 0 ? |  |  |  | X | X | 0 ? |
|  | Ventral | - | X | X | 0 ? | 0 ? | X | X | X | 1 ? | X | X |  |  |  | X | X | X |
| Caudal body | Dorsal | - | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |  |  |  | 2 | 1 | 1 |
|  | Right | - | $1 ?$ | 0 | 1 | X | X | X | X | $1 ?$ | $1 ?$ | X |  |  |  | X | X | X |
|  | Left | - | 1? | 0 | 1 | X | X | X | X | 1 ? | $1 ?$ | X |  |  |  | X | X | 0 ? |
|  | Right surface |  |  |  |  |  |  |  | X | X | X | 0 |  |  |  | 0 | X | X |
| facets | Right margin |  |  |  |  |  |  |  | X | X | X | X |  |  |  | X | X | X |
| (vertebral | Left surface |  |  |  |  |  |  |  | X | X | 0 | 0 |  |  |  | 0 | 0 | 0 |
|  | Left margin |  |  |  |  |  |  |  | X | X | X | 0 |  |  |  | X | X | 2 |
| Costal | Right surface |  |  |  |  |  |  |  | X | 0 | 0 |  |  |  |  |  |  | - |
| facets | Right margin |  |  |  |  |  |  |  | X | X | X |  |  |  |  |  |  | - |
| verse | Left surface |  |  |  |  |  |  |  | X | X | X |  |  |  |  |  |  | - |
|  | Left margin |  |  |  |  |  |  |  | X | X | X |  |  |  |  |  |  | - |

*Following Gómez-Olivencia, 2013.
Subchondral bone: $0=$ normal; $1=$ porosity; $2=$ eburnation, destruction of the subchondral surface (porosity), or fusion.
Osteophytic lipping: $0=$ none; $1=\operatorname{trace}(<1 \mathrm{~mm}) ; 2=$ moderate $(<4 \mathrm{~mm}) ; 3=$ major $(>4 \mathrm{~mm})$.
Intervertebral disc surfaces: $0=$ good condition; $1=$ porosity; $2=$ Schmorl's node, destruction of the subchondral surface (porosity), or eburnation.

## SOM Table S8

La Ferrassie 1 vertebral pathology from the elements kept in Box 38.

|  | Anatomical position | T7-T8? | T9 | T | L1? | L3? | L2 | L3 | L4 | L5 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Label | \#z | \#s1 | \#s2 | \#t2 | \#x | \#aa (21) | \#ab (22) | \#ad (23) | \#ac (24) |
|  | Right surface |  | X | 0 |  |  |  |  | 0 | 0 ? |
| Cranial facets | Right margin |  | X | 1 |  |  |  |  | 1 | X |
| Cranial facets | Left surface |  | X | X |  |  |  | 0 | 0 | 0-1 |
|  | Left margin |  | X | X |  |  |  | X | 1 | 2 |
|  | Right surface |  | X | X |  |  |  | 0 | 0 | 0 |
| Coudal facets | Right margin |  | X | X |  |  |  | 1 | 1 | 1-2 |
| Caudal facets | Left surface |  | X | X |  |  | 0 | 0 | 0 | 0 |
|  | Left margin |  | X | X |  |  | 2 | 3 | 3 | 2 |
|  | Surface | 0 ? | X | X | X | 0-1 |  |  |  |  |
|  | Ventral | X | X | X | 2 | 2 |  |  |  |  |
| Cranial body | Dorsal | 1 | X | X | X | 0 |  |  |  |  |
|  | Right | X | X | X | X | 3 |  |  |  |  |
|  | Left | X | X | X | X | X |  |  |  |  |
|  | Surface | X | 0 ? | X | 0 ? | 0 |  |  |  |  |
|  | Ventral | X | X | X | X | X |  |  |  |  |
| Caudal body | Dorsal | 2 | 0 | X | 0 | 0 |  |  |  |  |
|  | Right | X | X | X | 2 | 1 |  |  |  |  |
|  | Left | X | X | X | X | $1+$ |  |  |  |  |
|  | Right surface | X | 0 | X |  |  |  |  |  |  |
| Costal facets | Right margin | 1 | X | X |  |  |  |  |  |  |
| body) | Left surface | X | 0 ? | X |  |  |  |  |  |  |
|  | Left margin | X | 0 ? | X |  |  |  |  |  |  |

Subchondral bone: $0=$ normal; $1=$ porosity; $2=$ eburnation, destruction of the subchondral surface (porosity), or fusion.
Osteophytic lipping: $0=$ none; $1=$ trace $(<1 \mathrm{~mm}) ; 2=$ moderate $(<4 \mathrm{~mm}) ; 3=$ major $(>4 \mathrm{~mm})$.
Intervertebral disc surfaces: $0=$ good condition; $1=$ porosity; $2=$ Schmorl's node, destruction of the subchondral surface (porosity), or eburnation.

## SOM Table S9

Evidences of scoliosis in the LF1 spine.

| Physical label | Virtual label $^{\text {a }}$ | Anatomical position | Vertebral body (larger side) ${ }^{\text {b }}$ (Right/Left) | Articular pillar/mass (larger side) (Right/Left) | Spinous process twisting (in cranial view) | Rotation of the spinous process (in dorsal view) ${ }^{\text {c }}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | \#a | C1 | X | - | X | X |
| 2 | \#b | C2 | - | R (Left pathologically remodelled) |  |  |
| 3 | \#d | C3 | L (15.0/17.0) | R (Left pathologically remodelled) (8.5/6.4) | $\mathrm{L}\left(\sim 7^{\circ}\right)$ | Broken spinous process |
| 4 | \#c | C4 | - | R (13.5/11.0) | $\mathrm{R}\left(\sim 8^{\circ}\right.$ ) |  |
| 5 | \#e | C5 | - | L (9.9/11.3) | Straight | No rotation |
| 6 | \#f | C6 | - | = (12.4/12.4) | Straight | No rotation |
| 7 | \#g | C7 | - | - | $\mathrm{R}\left(\sim 8^{\circ}\right)$ |  |
| 8 | \#h | T1 | - | R ((30.2)/28.2) | $\mathrm{R}\left(\sim 7^{\circ}\right)$ | Clockwise (?). Tip missing. |
| 9 | \#i | T2 | R (17.3/16.5) | R (36.4/(34.0)) | $\mathrm{R}\left(\sim 5^{\circ}\right)$ | Clockwise ( $\sim 10^{\circ}$ ). Tip missing. |
| 10 | \#j | T3 | - | - | - | - |
| 11 | \#k1 | T4? | - |  |  |  |
| 11 | $\begin{aligned} & \# \mathrm{k} 3+\# \mathrm{k} \\ & 4 \end{aligned}$ | T4? |  |  | R | Clockwise (?) |
| 14 | \#q | T7 |  |  | Straight? | No rotation (?) |
| 19 | \#r | T12 | $=(23.7 / 24.0)$ | - | - | - |
|  | \#x | L3? | L (22.6/25.7) |  |  |  |
| 22 | \#ab | L3 | - | L (based on the crcd larger lower left facet) | - | Clockwise (?) |
| 23 | \#ad | L4 | - | R (48.6/(48.0)) Left side pathologically remodelled | $\mathrm{L}\left(\sim 3^{\circ}\right)$ | - |
| 24 | \#ac | L5 | - | - | Straight? | Clockwise ( $\sim 20-25^{\circ}$ ) |

${ }^{\text {a}}$ Following Gómez-Olivencia, 2013.
${ }^{\mathrm{b}}$ In cervical vertebrae, it refers to the development of the uncinate processes.
${ }^{\circ}$ No rotation refers to a rotation degree of $<5^{\circ}$.
$\mathrm{X}=$ This anatomical region does not exist in this vertebra.

- = Not possible to assess, due to preservation.

In the cervical vertebrae, the thickness of the articular pillars has been measured from the inferior surface (positioning the caliper parallel to the orientation of the facet), to the middle of the upper facet.
In thoracic and lumbar vertebrae, we have measured the bi-articular diameter, i.e., from the cranialmost point of the upper articular facet to the caudalmost point of the inferior articular facet.

## SOM Table S10

Absolute values ${ }^{a}$ and percentage asymmetry ${ }^{\text {b }}$ for the clavicular curvatures in cranial and dorsal views

| Specimen | Species | Cranial view |  |  |  |  |  | Dorsal view |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Internal curvature |  |  | External curvature |  |  | Inferior curvature |  |  | Superior curvature |  |  |
|  |  | R | L | \% asym. | R | L | \% asym. | R | L | \% asym. | R | L | \% asym. |
| La Ferrassie 1 | H. neanderthalensis | 13.2 | 12.3 | 7.3 | 14.2 | 17.7 | 24.6 | 5.4 | 8.2 | 51.8 | 5.8 | 2.6 | 123.1 |
| Kebara 2 | H. neanderthalensis | 11.3 | 11.1 | 1.8 | 9.5 | 16.5 | 73.7 | 3.4 | 4.9 | 44.1 | 0.0 | 0.0 | 0.0 |
| Regourdou 1 | H. neanderthalensis | 10.0 | 11.9 | 19.0 | 14.5 | 13.2 | 9.8 | 7.4 | 3.0 | 146.7 | 8.0 | 3.2 | 150.0 |
| $\begin{aligned} & \text { KNM-WT } \\ & 15000 \end{aligned}$ | Homo erectus | 13.1 | 15.3 | 16.8 | 14.6 | 14.7 | 0.7 | 5.0 | 5.3 | 6.0 | 7.4 | 8.1 | 9.5 |

$\mathrm{R}=$ Right; L = Left; asym. = asymmetry.
${ }^{\text {a }}$ Values from Voisin (2006).
${ }^{\mathrm{b}}$ Calculated following Franciscus and Churchill, 2002.

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