

SUPPLEMENTARY INFORMATION

Feuerriegel et al. Upper limb fossils of *Homo naledi* from the Lesedi Chamber, Rising Star System, South Africa

SUPPLEMENTARY DESCRIPTIONS

U.W. 102a-018

U.W. 102a-018 is a left distal radius, 54 mm in length, broken just superior to the distal articular surfaces, of which it preserves nothing. This specimen is non-diagnostic, though not dissimilar in shape to other distal radial fragments from Site 101. There is a slight rugosity on the lateral margin alongside a very faint sulcus on the anterior surface, possibly indicating the insertion of *M. brachioradialis*. The anterior surface is flattened and flares in a manner expected for distal radii (more so laterally than medially). On the posterior surface beginning at the superior point of breakage are two parallel grooves running proximodistally, possibly resulting from animal gnawing. The distal point of breakage appears to occur along a slight ridge, most probably the posterior ridge leading to the ulnar facet of the radius. Diaphyseal cross-sectional morphology at the proximal point of breakage is tear-drop shaped with the apex of the drop occurring laterally.

U.W. 102a-040

U.W. 102-040 is a fragment of radius or ulna shaft, poorly preserved, and of indeterminate siding. No diagnostic features are preserved in this specimen.

U.W. 102a-206

U.W. 102-206 is a left clavicular midshaft fragment, ca. 41 mm in length. The shaft is 9.4 mm AP by 7.7 mm SI, and compares favourably to U.W. 102-021 in overall side, curvature, and shaft morphology, however very little else can be said about it.

U.W. 102a-455

Radial or ulnar midshaft fragment, 31 mm in length. This specimen is non-diagnostic. Cross-sectional shape of the diaphysis is D-shaped.

U.W. 102a-456

This specimen is a non-diagnostic fragment of either radius or ulna shaft, approximately 27 mm in length. There is a lump of mineralised sediment/bone adhering to one aspect of this fragment.

Figure S1. Method used to estimate trochlear notch orientation in the incomplete U.W. 102a-015/020 ulna. After Haile-Selassie et al. (Haile-Selassie et al., 2010). The angular measurement is used to estimate the orientation of the trochlear notch. Dotted lines on the ulna itself illustrate areas of erosion to the anterior-most margins of the anconeal and coronoid processes.

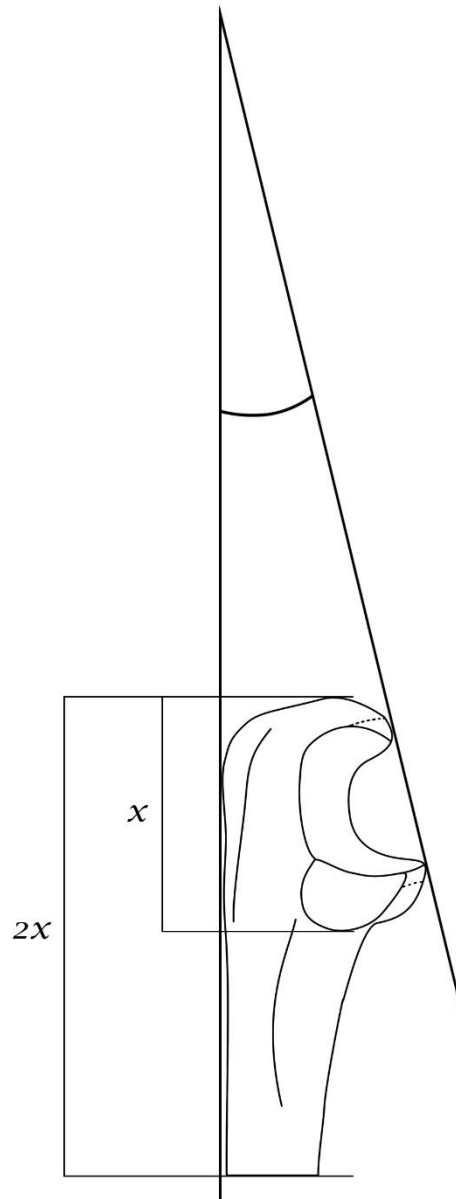


Table S1. Indices and measurements taken on comparative and fossil clavicles for the purposes of this study. See attached Excel document.

Table S2. Sample sizes for each species and each measurement for clavicular metrics. For early *Homo*, Neandertal, australopith, and early modern human remains, refer also to Table S1.

	Max. length	Circumference	AP diameter	SI diameter	Rhomboid facet	Subclavian sulcus	Curvatures
<i>Gorilla</i> sp.	33	23	23	23	33	33	33
<i>Pan troglodytes</i>	25	22	22	22	24	24	25
<i>Pan pansiscus</i>	19	0	0	0	19	19	19
<i>Pongo pygmaeus</i>	24	8	8	8	23	23	24
Modern human	33	23	23	23	31	31	33
Neandertal ^a	13	28	30	30	21	25	17
Early <i>Homo</i> ^b	4	11	14	14	5	5	5
Australopithecine ^c	4	2	4	4	0	2	0
Early modern human remains ^d	37	30	29	29	25	18	26
<i>Homo naledi</i>	1	2	6	6	1	4	1

^a **Neandertal:** Sample includes following clavicles: Régourdou right & left, Kebara right & left, La Ferrassie 1 right & left, Krapina 153 left, Neanderthal right, Tabun right & left, Amud right, Shanidar 1 right & left, Shanidar 3 right & left, Spy right & left, la Chapelle-aux-Saints left, Krapina 142 right, Krapina 143 right, Krapina 154 left, Krapina 149 right, Krapina 145 right, Krapina 144 right; Krapina 155 left, Krapina 156 left, Krapina 157 left, Krapina 146 right, Krapina 147 right, Krapina 151 left; Krapina 152 left; M-D2-586 right, M-F1-318 left, SD 2100 left., SDR 016+ left, SD 2011 left and SDR 17 left.

^b **Early Homo:** Sample includes following clavicles: KNMWT15000 right & left, KNM-ER 1808, OH48 left, ATD6-50 right, AT-247 right, AT-550 right, AT-1106 left, AT-1259 right, A63 right, A91 left, Ehringsdorf G5, D4161 left, D4162 right,

^c ***Australopithecine:** Sample includes MH2 right, AL333x-6/9 right, KSD-VP-1-1f left, AL 288-1bz, STW 431 right, and STW 606 left.

^d **Early modern human:** Sample includes Cavillon right & left, Paglicci 25 right & left, Paglicci 12 right & left, Barma Grande 2 right, Grotte des Enfants 4 right, Abri Pataud 1513 right, Abri Pataud 22 right, Chancelade right & left, Saint Germain la Rivière right, Saint Rabier right & left, Nazlet Khater 2 right & left, Dolní Věstonice (dv 3 right & left, dv13 right & left, dv 14 right & left, dv 15 right & left, dv 16 right & left), Pavlov 1 right & left, Rochereil right and left, Omo I KHS left, Qafzeh 9 left, Taforlat (Taf V-6 right, Taf XXIII left, Taf XIX-3a left, Taf V-24 left, Taf XI-AR right, Taf XVa left, Taf XVc left, Taf XVII-26 right, Taf XVIII-6 right, Taf XIIIa left, Taf VIII-3bis left, Taf XXVa right, Taf IX-39 left, Taf XIIIb right, Taf XVIIa right, Taf XVI-15 right; Taf XVI right, Taf XIV left, Taf 24-5 right, Taf XIX-3 right, Taf XXVc left).

Sample size information for each of the analyses conducted

Table S3. Clavicle curvatures in superior and posterior view within extant hominoids and extinct hominins. Also refer to Figures 7 and 8 in the text.

Fossil Population	Specimens included
<i>Homo naledi</i>	U.W. 102a-021
<i>Homo neanderthalensis</i>	Régourdou right & left, Kebara right & left, La Ferrassie 1 right & left, Krapina 153 left, Neanderthal right, La Chapelle-aux-Saints left, Krapina 142 right, Krapina 143 right, Krapina 154 left, Krapina 149 right, Krapina 145 right, Krapina 144 right, Krapina 155 left, Krapina 156 left
Early <i>Homo</i>	KNM-WT 15000 right and left, ATD6-50 right, A63 right, OH 48 left
Early modern human remains	Cavillon right, Abri Pataud 1513 right, Nazlet Khater 2 right & left, Omo I left, Qafzeh 9 left, Taforlat (Taf V-6, Taf XXIII, Taf XIX-3a, Taf V-24, Taf XI-AR, Taf XVa, Taf XVc, Taf XVII-26, Taf XVIII-6, Taf XIIIa, Taf VIII-3bis, Taf XXVa, Taf IX-39, Taf XIIIb, Taf XVIIa, Taf XVI-15; Taf XVI, Taf XIV, Taf 24-5, Taf XIX-3, Taf XXVc)
Extant Species	Sample size
<i>Homo sapiens</i>	33
<i>Pan troglodytes</i>	25
<i>Pan paniscus</i>	19
<i>Gorilla sp.</i>	33
<i>Pongo pygmaeus</i>	24

Table S4. Absolute clavicle length (in mm) in extant hominoids and extinct hominins, including *Homo naledi*. Also refer to Figure 10 in the text.

Fossil Population	Specimens included
<i>Homo neanderthalensis</i>	Régourdou right, Kebara left, La Ferrassie 1 right & left, Krapina 143 right, Krapina 153 left, Krapina 154 left, Neanderthal right, Tabun right & left, Shanidar 1 left, Shanidar 3 right, SD 2100 left
Early <i>Homo</i>	KNM-WT 15000 right & left, KNM-ER 1808, and OH 48 left
Early modern human remains	Cavillon right, Barma Grande 2 right, Grotte des Enfants 4 right, Abri Pataud 1513 right, Chancelade right, Saint Germain la Rivière right, Nazlet Khater 2 right & left, Dolní Věstonice (dv13 right & left, dv 14 left, dv 15 left, dv 16 right), Rochereil right and left, Omo I KHS left, Taforlat (Taf V-6, Taf XXIII, Taf XIX-3a, Taf V-24, Taf XI-AR, Taf XVa, Taf XVc, Taf XVII-26, Taf XVIII-6, Taf XIIIa, Taf VIII-3bis, Taf XXVa, Taf IX-39, Taf XIIIb, Taf XVIIa, Taf XVI-15; Taf XVI, Taf XIV, Taf 24-5, Taf XIX-3, Taf XXVc)
<i>Australopithecus sp.</i>	MH2 right, AL333x-6/9 right, KSD-VP-1-1f left, STW 431 right
Extant Species	Sample size
<i>Homo sapiens</i>	33
<i>Pan troglodytes</i>	25
<i>Pan paniscus</i>	19
<i>Gorilla sp.</i>	33
<i>Pongo pygmaeus</i>	24

Table S5. Clavicle circumference (in mm) within extant hominoids and extinct hominins. Also refer to Figure 12 in the text.

Fossil Population	Specimens included
<i>Homo naledi</i>	U.W. 101-258, U.W. 102a-021
<i>Homo neanderthalensis</i>	Régourdou right & left, Kebara right & left, La Ferrassie 1 right & left, Krapina 153 left, Neanderthal right, Tabun right & left, Amud I right, Shanidar 1 right & left, La Chapelle-aux-Saints left, Krapina 142 right, Krapina 143 right, Krapina 154 left, Krapina 149 right, Krapina 145 right, Krapina 155 left, Krapina 156 left, Krapina 146 right, Krapina 151 left, Krapina 152 left, M-D2-586 right, SD 2100 left, SDR 016+ left, SD 2011 left.
Early <i>Homo</i>	KNM-WT 15000 right and left, ATD6-50 right, AT-247 right, AT-550 right, AT-1106 left, AT-1259 right, A63 right, A91 left, Ehringsdorf G5, OH 48 left
Early modern human remains	Cavillon right & left, Paglicci 25 right & left, Paglicci 12 right & left, Barma Grande 2 right, Grotte des Enfants 4 right, Abri Pataud 1513 right, Abri Pataud 22 right, Chancelade right & left, Saint Germain la Rivière, Saint Rabier right & left, Nazlet Khater 2 left, Dolní Věstonice (dv 3 right & left, dv 13 right & left, dv 14 right & left, dv 15 right & left, dv 16 right & left), Pavlov 1 right & left, Rochereil right & left
<i>Australopithecus sp.</i>	MH2 right, KSD-VP-1-1f left
Extant Species	Sample size
<i>Homo sapiens</i>	23
<i>Pan troglodytes</i>	22
<i>Gorilla sp.</i>	23
<i>Pongo pygmaeus</i>	8

Table S6. Clavicle robusticity within extant hominoids and extinct hominins. Also refer to Figure 13 in the text.

Fossil Population	Specimens included
<i>Homo naledi</i>	U.W. 102a-021
<i>Homo neanderthalensis</i>	Régourdou right, Kebara left, La Ferrassie 1 right & left, Krapina 153 left, Neanderthal right, Tabun right & left, Shanidar 1 left, Krapina 143 right, Krapina 154 left, SD 2100 left
Early <i>Homo</i>	KNM-WT 15000 right and left, ATD6-50 right
Early modern human remains	Cavillon right, Barma Grande 2 right, Grotte des Enfants 4 right, Abri Pataud 1513 right, Abri Pataud 22 right, Chancelade right, Saint Germain la Rivière, Saint Rabier right & left, Nazlet Khater 2 left, Dolní Věstonice (dv 13 right & left, dv 14 left, dv 15 left, dv 16 right), Rochereil right & left
<i>Australopithecus sp.</i>	MH2 right, KSD-VP-1-1f left
Extant Species	Sample size
<i>Homo sapiens</i>	23
<i>Pan troglodytes</i>	22
<i>Gorilla sp.</i>	23
<i>Pongo pygmaeus</i>	8

REFERENCES

Haile-Selassie, Y., Latimer, B.M., Alene, M., Deino, A.L., Gibert, L., Melillo, S.M., Saylor, B.Z., Scott, G.R., Lovejoy, C.O., 2010. An early *Australopithecus afarensis* postcranium from Woranso-Mille, Ethiopia. *Proc. Natl. Acad. Sci.* 107, 12121-12126.