Patterns of Humeral Asymmetry among Late Pleistocene Humans: Supporting Information

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Section I: Humeral osteometrics, body mass estimates and cross-sectional geometry parameters for Late Pleistocene humans.

Data are provided for Late Pleistocene humeri, including both those used in the asymmetry analysis and specimens providing only unilateral data. Unless otherwise noted, data derive from the personal research of the authors.

Table S1a: Body mass and humeral osteometric measurements of the Late Pleistocene samples included in the study; Neandertals and Middle Paleolithic modern humans.

Neandertals	**Sex**[1]	**Body Mass**[2]	**Length**[3] **R**[4]	**Length L**	**Diam Mid Max**[5] **R**	**Diam Mid Min R**	**Diam Mid Max L**	**Diam Mid Min L**
Amud 1	M	79.0					24.5	17.5
La Chapelle-aux-S. 1	M	81.1	309		25.0	20.5	22.5	17.2
La Ferrassie 1	M	84.9		334	24.3	17.6	22.2	15.7
La Ferrassie 2	F	66.4	285		20.0	14.1		
Kebara 2	M	64.8	314	321	27.2	20.3	25.2	18.2
Lezetxiki 1	U[6]		317		22.8	18.7		
Oliveira 7	U[6]				25.0	19.3		
Palomas 16	F[6]						19.8	14.3
Palomas 92	F[6]	61.7	262		18.2	17.3		
Palomas 96	F	59.9	270		18.0	12.2	18.5	13.8
La Quina 5	U[6]		(310)		24.1	18.9	18.9	14.7
Regourdou 1	M	65.6	307		23.2	16.8		
St.-Césaire 1	M[6]			309			22.8	17.6
Shanidar 3	M		(315)		26.4	17.6		
Shanidar 4	M	73.5	301		26.8	19.0		
Shanidar 6	F[6]			(289)	20.0	14.4		
Spy 1	U[6]				20.5	14.7	20.9	13.9
Spy 2	U[6]	85.5	(300)	(300)	23.5	17.0	23.5	17.0
Tabun 1	F	63.3		285				
Middle Paleolithic Modern Humans								
Qafzeh 8	M[5]		369		24.1	19.8		
Qafzeh 9	F	63.3	329		23.0	18.5		
Skhul 2	F[5]		(356)		19.0	12.7		
Skhul 4[7]	M	69.0		332	23.0	20.0	21.0	17.0
Skhul 5	M	68.8	375	375	21.3	18.0	20.5	17.5
Skhul 7	F[5]				18.5	12.5	17.2	13.5

[1] M: male; F: female; U: undetermined.
[2] Body mass is in kg.
[3] Humeral length (in mm) is physiological length (1b in Bräuer, 1988). Length measurements in parentheses are estimated. A single right-left length indicates both bones were used for the length estimation.
[4] R: right; L: left.
[5] Midshaft diameters (in mm); Max: maximum; Min: minimum.
[6] No preserved os coxa.
[7] Right Skhul 4 data from McCown and Keith (1939).

Table S1b: Body mass and humeral osteometric measurements of the Late Pleistocene samples included in the study; Early Upper Paleolithic modern humans.

Early Upper Paleolithic	Sex[1]	Body Mass[2]	Length[3] R	Length L	Diam Mid Max[4] R	Diam Mid Min R	Diam Mid Max L	Diam Mid Min L
Barma Grande 5[5]	M			344			23.5	17.5
Bausu da Ture 1	M[6]	77.3						
Bausu da Ture 2	M	73.1		359				
Caviglione 1	F	66.8		331	23.1	18.8		
Cro-Magnon 1 (4294)	U[6]	66.6	318	319	23.5	18.5		
Cro-Magnon 4293	U[6]			333			19.3	15.3
Cro-Magnon 4296	M				23.4	18.1		
Dolní Věstonice 3	F	54.3		306	19.4	15.6	18.8	14.2
Dolní Věstonice 13	M	69.5	332	327	23.9	19.8	21.2	16.6
Dolní Věstonice 14	M	77.8	371		23.9	19.4	20.2	17.3
Dolní Věstonice 16	M	76.6		326	23.5	18.3	20.4	18.2
Dolní Věstonice 41	U[6]							
Grotte-des-Enfants 4	M	82.5	363	360			24.0	18.0
Grotte-des-Enfants 5	F	60.8		288				
Mladeč 24	U[6]		(360)		21.9	15.5		
Mittlere Klause 1	M[6]	72.0		302				
Nazlet Khater 2[7]	M		309	312				
Nahal En'Gev 1	F[6]		(284)	(284)				
Ostuni 1	F	68.3	324	324	21.0	18.5	20.5	18.0
Paglicci 25[5]	F	60.5	321	316	23.0	18.0	23.0	18.0
Pataud 3	F[6]	58.1	307		20.7	16.2	20.4	16.6
Pataud 5	M[6]			317			21.9	18.6
Paviland 1	M	72.4		333			19.4	15.7
Pavlov 1	M[6]		370	370	24.5	18.4	22.8	17.8
Předmostí 3[8]	M	70.7	355	349	22.0	18.0	21.0	18.0
Předmostí 4[8]	F	71.7	320	314	22.0	16.0	20.0	20.0
Předmostí 9[8]	M	55.7	324	326	19.0	18.0	17.0	16.0
Předmostí 10[8]	F	71.7	306	308	20.0	17.0	20.0	16.0
Předmostí 14[8]	M	66.2	331	330	21.0	17.0	20.0	17.0
Sunghir 1	M	77.6	360		23.8	19.5	22.2	20.6
Tianyuan1	M[6]	85.1		327	23.6	17.7	20.0	15.1

[1] M: male; F: female; U: undetermined.
[2] Body mass is in kg.
[3] Humeral length (in mm) is physiological length (1b in Bräuer, 1988); R: right; L: left. Length measurements in parentheses are estimated.
[4] Midshaft diameter (in mm); Max: maximum; Min: minimum.
[5] Data from Churchill, 1994.
[6] No preserved os coxa.
[7] Data from Crevecoeur, 2008.
[8] Data from Matiegka (1938).

Table S1c: Body mass and humeral osteometric measurements of the Late Pleistocene samples included in the study; West Eurasia Late Upper Paleolithic modern humans.

Western Eurasia Late Upper Paleolithic	Sex[1]	Body Mass[2]	Length[3] R	Length L	Diam Mid Max[4] R	Diam Mid Min R	Diam Mid Max L	Diam Mid Min L
Arene Candide 2	M	73.1	301	304	25.5	19.0	19.5	15.5
Arene Candide 3	M	62.7	268	270			20.0	15.5
Arene Candide 4	M	70.7	300	302	25.0	17.0	21.5	15.0
Arene Candide 5	M	70.7	296	291	22.0	17.0	21.3	16.0
Arene Candide 10	M[5]	69.2	289	302	21.0	16.0		
Arene Candide 12	M	76.2	315		25.0	18.0	21.5	15.0
Arene Candide 13	U[5]			273				
Arene Candide 14	U[5]			280			19.5	15.5
Cap Blanc 1	F	58.4	304	297	22.0	16.1	21.4	15.5
Chancelade 1	F[5]	65.7	298		25.7	18.5	21.2	17.0
Continenza 1	M	67.3	283		23.0	16.5	23.0	18.0
Ein Gev 1	F[5]		(295)	(295)	20.4	19.5	19.6	17.7
Farincourt 1[6]	U[5]		281	285				
Les Forges E546	U[5]						21.4	15.1
Lafaye 1	F	59.5		295			20.2	15.8
Laugerie Basse unn[6].	M	82.1	(343)	(343)				
Madeleine 1[6]	U[5]	66.7	(327)					
Mataha F-81	M[5]	58.0	(280)					
Neve David 1	U[5]		(301)					
Oberkassel 1	M	72.5	318	320	22.3	18.5	25.2	21.0
Oberkassel 2	F	54.1		275	19.6	16.6	20.1	17.2
Ohalo 2	M	73.3	338	330	21.7	17.7	19.3	15.6
Peyrat 5	M[5]	66.9	313	314	23.5	17.3	26.6	19.9
Placard 16[6]	U[5]	69.9	292					
Romanelli 1[6]	M	66.6	326	323				
Romanelli 4[6]	U[5]			304				
Romito 1[7]	F[5]		258		17.0	13.5	15.0	12.5
Romito 3[7]	M	72.1	313	313	25.0	18.0		
Romito 4[7]	M[5]	66.2	292	287	23.0	16.5	20.0	15.0
Romito 5[7]	F	75.4			19.0	15.0	18.0	13.0
Romito 6[7]	F				20.0	14.0	19.5	12.5
St-Germain-la-R. 4	F	61.7	298	290	22.0	17.0		
San Teodoro 1	F	77.9	302		25.0	24.0		
Villabruna 1[8]	M	73.1	313	312	23.0	17.5	20.0	16.0

[1] M: male; F: female; U: undetermined.
[2] Body mass is in kg.
[3] Humeral length (in mm) is physiological length (1b in Bräuer, 1988); R: right; L: left. Length measurements in parentheses are estimated; a single right-left length indicates both bones were used for the length estimation.
[4] Midshaft diameter (in mm); Max: maximum; Min: minimum.
[5] No preserved os coxa.
[6] Data from Churchill. 1994.
[7] Length and diameter measurements from Mallegni and Fabbri (1995).
[8] Data from G. Vercellotti, pers. comm. (Vercellotti et al., 2008).

Table S1d: Body mass and humeral osteometric measurements of the Late Pleistocene samples included in the study; East Eurasia Late Upper Paleolithic modern humans.

Eastern Eurasia Late Upper Paleolithic	Sex[1]	Body Mass[2]	Length[3] R	Length L	Diam Mid Max[4] R	Diam Mid Min R	Diam Mid Max L	Diam Mid Min L
Minatogawa 1	M	60.4	285		20.5	15.5	20.5	25.5
Minatogawa 2	F	42.9	259		17.0	13.0	17.0	13.0
Minatogawa 3	F	48.8		(275)	17.0	12.5	16.0	12.5
Minatogawa 4	F	42.3	280		21.0	14.0	20.0	14.0
Tam Hang 2	F	52.1	265	262	18.7	13.6	17.6	12.7
Tam Hang 3	F	52.1	260	257	18.9	13.9	18.8	13.9
Tam Hang 7	F	42.3	273	273	19.8	14.0	18.7	13.8
Tam Hang 11	F		252	250	19.7	14.2	19.5	14.2
Tam Hang 13	F		284	284	20.4	13.5	19.6	13.4
Tam Hang 14	M	70.5	311	311	21.9	13.4	21.9	16.1

[1] M: male; F: female; U: undetermined.
[2] Body mass is in kg.
[3] Humeral length (in mm) is physiological length (1b in Bräuer, 1988); R: right; L: left. Length measurement in parentheses is estimated.
[4] Midshaft diameter (in mm); Max: maximum; Min: minimum.

Table S1e: Body mass and humeral osteometric measurements of the Late Pleistocene samples included in the study; North Africa Late Upper Paleolithic modern humans.

North Africa Late Upper Paleolithic	Sex[1]	Body Mass[2]	Length[3] R	Length L	Diam Mid Max[4] R	Diam Mid Min R	Diam Mid Max L	Diam Mid Min L
Afalou 1	U[5]	86.7	343		24.4	21.7		
Afalou 2	M	76.9	324	332	22.8	22.7	20.9	20.5
Afalou 3	F	74.6	330	330	22.9	21.5	20.6	20.3
Afalou 10	M[5]		337	339	23.2	22.6	21.2	20.8
Afalou 11	M[5]	88.0		341			23.2	23.0
Afalou 13	M	76.6	329		24.0	22.0	22.0	20.8
Afalou 25	M[5]	71.9	333	333	22.6	20.9	21.5	19.3
Afalou 27	M	75.7	317	322	22.1	21.7	19.5	19.5
Afalou 28	M	76.6	319	320	24.2	23.2	22.4	20.4
Sahaba 10	M	62.2		333	21.8	19.5	19.3	18.3
Sahaba 15	F				18.3	17.7	18.2	16.6
Sahaba 16	F		298	298	19.5	17.6	18.1	17.0
Sahaba 17	M	59.7			20.5	18.4		
Sahaba 19	M	67.3		318	22.9	20.1	21.0	18.5
Sahaba 20	M	61.1	322		21.5	20.6		
Sahaba 21	M						18.1	17.7
Sahaba 22	F	61.3		298	20.7	20.0	19.9	18.9
Sahaba 25	F		293	293	19.3	18.9	19.5	17.8
Sahaba 28	F	53.7	296	296	16.6	16.4	17.3	16.4
Sahaba 29	M	77.1			23.1	21.8	23.8	23.4
Sahaba 33	F				18.5	16.4	18.3	16.6
Sahaba 37	F							
Sahaba 38	M		343	343	21.9	21.2	20.4	19.4
Sahaba 39	M	66.9	324	324	22.7	18.4	18.7	18.2
Sahaba 40	M	61.5	348		23.4	22.1	22.8	20.4
Sahaba 41	F	61.5			21.2	19.6	21.9	19.5
Sahaba 42	M				22.3	19.9	21.0	20.5
Sahaba 102	F[5]		319	319	19.1	18.1	18.0	17.8
Wadi Halfa 1	F[5]	68.6	294	294			19.5	17.8
Wadi Halfa 2	M[5]	71.7			22.5	20.8	22.4	20.8
Wadi Halfa 3	M[5]	55.7	307	307			21.5	20.1
Wadi Halfa 6	F[5]						21.1	18.1
Wadi Halfa 7	F[5]						17.7	17.2
Wadi Halfa 11	F[5]	57.0	304	304	17.3	16.3	15.5	15.3
Wadi Halfa 12	M[5]		323	323	20.4	19.8	19.5	18.9
Wadi Halfa 13	F[5]	58.1			18.8	16.9	17.2	16.8
Wadi Halfa 14	F[5]		302	302			17.2	14.6
Wadi Halfa 15	F[5]	53.9			17.0	15.9	18.1	14.6
Wadi Halfa 20	F[5]	49.0			18.5	18.2	20.0	16.9
Wadi Halfa 23	M[5]	44.5					23.2	19.5
Wadi Halfa 24	M	55.9	330	324	23.9	21.7	21.8	21.0
Wadi Halfa 25	F	68.6	305	305	21.7	18.6	21.3	19.1
Wadi Halfa 26	M[5]	57.0	311	311	22.5	21.2	20.8	19.8
Wadi Halfa 28	F[5]	66.2	310	310	21.6	19.5	21.2	19.8
Wadi Halfa 31	M[5]		332	337	22.1	22.0	20.9	20.4
Wadi Halfa 32	F[5]		307	307	18.5	18.2	19.1	16.5
Wadi Halfa 34	F	64.8	327	327	21.8	20.2	21.6	20.5
Wadi Halfa 36	F[5]	66.4	299	304	19.4	18.6	21.4	19.4
Wadi Halfa 37	M[5]	58.7	326	326	23.3	22.9	22.4	20.1

Table S1e Notes
[1] M: male; F: female; U: undetermined.
[2] Body mass is in kg.
[3] Humeral length (in mm) is physiological length (1b in Bräuer, 1988); R: right; L: left.
[4] Midshaft diameter (in mm); Max: maximum; Min: minimum.
[5] No preserved os coxa.

Table S2a: Right humeral mid-distal (35%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; Neandertals and Middle Paleolithic modern humans.[1]

Neandertals	**TA 35% R**	**CA 35% R**	**Ix 35% R**	**Iy 35% R**	**Imax 35% R**	**Imin 35% R**	**J 35% R**
La Chapelle-aux-S. 1*	345.9	261.8	9691	8431	9970	81535	18122
La Ferrassie 1*	311.4	230.5	8562	61538	8738	59779	14715
La Ferrassie 2	207.0	156.7	3734	2831	3935	2630	6565
Kebara 2*	361.0	270.3	11662	8169	11713	8118	19830
Lezetxiki 1	300.9	239.7	7912	61636	8191	5884	14075
Oliveira 7	348.1	304.5	10955	8334	10963	8327	19290
Palomas 92	264.4	233.0	5823	5544	5834	5533	11367
La Quina 5	314.2	254.6	7751	7444	8245	7650	15895
Regourdou 1	311.9	276.7	7902	7617	8547	6972	15519
Spy 1	228.1	190.5	4881	37969	5568	3014	8582
Spy 2*	309.2	258.2	8704	6516	9293	6071	15363
Tabun 1*	218.0	183.9	3925	3578	3928	3574	7503
Middle Paleolithic Modern Humans							
Qafzeh 8	366.9	308.9	10760	10382	11625	9517	21142
Qafzeh 9	294.4	246.0	7706	6070	8366	5410	13776
Skhul 2*	191.6	134.0	3464	21256	3473	2116	5588
Skhul 5*	305.8	239.0	7570	6651	7584	6637	14223
Skhul 7*	178.0	150.5	3070	2028	3093	2005	5098

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity; J: polar moment of area. * indicates that the specimen provides asymmetry for the 35% section.

Table S2b: Right humeral mid-distal (35%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; Early Upper Paleolithic modern humans.[1]

Early Upper Paleolithic	TA 35% R	CA 35% R	Ix 35% R	Iy 35% R	Imax 35% R	Imin 35% R	J 35% R
Bausu da Ture 1*	426.7	350.3	15364	13141	15365	13139	28505
Bausu da Ture 2*	398.2	328.4	13898	10895	14177	10616	24793
Cro-Magnon 1 (4294)*	295.5	200.8	7415	5205	7471	5148	12619
Cro-Magnon 4296[2]	344.6	272.6	11358	7802			19160
Dolní Věstonice 3*	197.3	150.6	3553	2423	3558	2418	5975
Dolní Věstonice 13*	357.9	296.3	11136	8879	11213	8802	20015
Dolní Věstonice 14*	337.9	248.3	10427	6775	10427	6775	17202
Dolní Věstonice 16*	336.3	209.5	8389	7261	8979	6671	15650
Dolní Věstonice 41	249.5	220.4	5621	4292	5634	4279	9913
Grotte-des-Enfants 4[2]*	400.9	298.0	14415	10107	14518	10003	24521
Mladeč 24	263.4	201.9	6350	4516	6753	4113	10866
Mittlere Klause 1[2*]	331.7	275.2	8764	8473			17237
Nazlet Khater 2[3]*	319.6	261.0	7902	8211	8281	7831	16113
Nahal En'Gev 1*	155.4	138.9	2283	1638	2301	1620	3921
Paglicci 25[2*]	284.8	233.6	6986	5706	7259	5406	12665
Pataud 3*	248.8	188.4	5119	4329	5438	4010	9448
Pavlov 1*	349.9	241.4	9329	8228	9715	7843	17558
Sunghir 1*	331.7	239.5	9588	6932	9638	6882	16520
Tianyuan1*	357.2	300.4	10613	9403	11312	8704	20016

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity; J: polar moment of area. * indicates that the specimen provides asymmetry for the 35% section.

[2] Data from Churchill, 1994; values for specimens lacking Imax and Imin derive from cortical thicknesses and ellipse formulae.

[3] Data from Crevecoeur, 2008.

Table S2c: Right humeral mid-distal (35%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; West Eurasia Late Upper Paleolithic modern humans.[1]

Western Eurasia Late Upper Paleolithic	TA 35% R	CA 35% R	Ix 35% R	Iy 35% R	Imax 35% R	Imin 35% R	J 35% R
Arene Candide 2[2]*	321.5		8841	6964	9434	6364	15798
Arene Candide 3*	295.4	237.6	8496	5338	8497	5338	13834
Arene Candide 4[2]*	293.6		6823	6407	7680	5541	13221
Arene Candide 5[2]*	321.7		8399	7317	8676	7029	15705
Arene Candide 10[2]*	230.0		4750	3369	4765	3351	8116
Arene Candide 12[2]*	330.1		8976	7467	9034	7397	16431
Cap Blanc 1[3]*	240.6	161.7	5032	3513			8545
Chancelade 1[3]	355.6	273.0	10177	9772			19950
Continenza 1[2]*	336.5		8193	6670	8260	6594	14853
Ein Gev 1*	278.2	223.3	6417	5535	6538	5415	11952
Farincourt 1[3]	206.1	145.8	3410	2491			5901
Lafaye 1*	251.5	202.9	5029	4819	5067	4781	9848
Laugerie Basse un. [3]*	337.2	265.3	9337	8665			18002
Madeleine 1[3]	291.6	233.2	7217	6095			13312
Mataha F-81[4]*	235.8	215.1	4466	4415	4467	4414	8881
Oberkassel 1*	304.1	215.4	6973	6608	6990	6591	13581
Ohalo 2*	301.7	210.6	6784	6432	6844	6372	13216
Romanelli 1[3]*	332.0	288.0	9552	8238			17790
Romito 3[3]*	293.0	264.4	7355	6347			13702
Romito 4[3]*	291.2	251.3	7463	5930			13393
St-Germain-la-R. 4[3]*	255.3	189.0	5644	4121			9765
San Teodoro 1[2]*	373.0		10581	10571	11284	9846	21130
Villabruna 1[5]*	331.8	292.5	9126	8301	9126	8301	17427

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity; J: polar moment of area. * indicates that the specimen provides asymmetry for the 35% section.
[2] CSG calculated from periosteal molds and regression equations (Sparacello and Pearson, 2010).
[3] Data from Churchill, 1994; values for specimens lacking Imax and Imin derive from cortical thicknesses and ellipse formulae.
[4] Data from J.T. Stock, pers. comm. (Stock et al., 2005).
[5] Data from G. Vercellotti, pers. comm. (Vercellotti et al., 2008).

Table S2d: Right humeral mid-distal (35%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; East Eurasia Late Upper Paleolithic modern humans.[1]

Eastern Eurasia Late Upper Paleolithic	**TA 35% R**	**CA 35% R**	**Ix 35% R**	**Iy 35% R**	**Imax 35% R**	**Imin 35% R**	**J 35% R**
Minatogawa 1[2]*	254.7	196.9	4902	4986	5155	4733	9888
Minatogawa 2[2]*	195.0	141.7	2581	3048	3141	2488	5629
Minatogawa 3[2]*	191.1	160.7	3326	2640	3461	2504	5965
Minatogawa 4[2]*	236.3	170.0	4525	3813	4900	3439	8339
Tam Hang 2*	194.9	155.2	3194	2706	3261	2639	5900
Tam Hang 3*	194.0	149.0	3383	2399	3384	2399	5782
Tam Hang 7*	211.7	143.7	3831	2510	3836	2505	6341
Tam Hang 11*	207.2	163.0	3632	3001	3750	2882	6633
Tam Hang 13*	234.4	176.7	4927	3430	4976	3381	8357
Tam Hang 14*	256.5	217.0	5099	5430	5609	4920	10529

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity; J: polar moment of area. * indicates that the specimen provides asymmetry for the 35% section.

[2] Data from T. Kimura, pers. comm. (Kimura and Takahashi, 1992).

Table S2e: Right humeral mid-distal (35%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; ; North Africa Late Upper Paleolithic modern humans.[1]

North Africa Late Upper Paleolithic	TA 35% R	CA 35% R	Ix 35% R	Iy 35% R	Imax 35% R	Imin 35% R	J 35% R
Afalou 1	326.7	294.8	7787	9286	9387	7685	17072
Afalou 2*	373.7	343.9	10038	12494	12728	9804	22532
Afalou 3*	321.8	238.5	8267	7265	8590	6941	15532
Afalou 10*	341.4	255.8	9363	8585	11086	6862	17948
Afalou 13*	369.2	331.9	11995	9813	11996	9812	21808
Afalou 25*	292.7	236.3	7475	5910	7805	5580	13385
Afalou 27*	343.2	275.6	9431	8741	9495	8677	18172
Afalou 28*	393.5	339.1	13127	11468	13227	11368	24595
Sahaba 10*	315.1	290.4	7314	8641	9244	6711	15955
Sahaba 15*	216.3	178.1	4219	3111	4246	3085	7330
Sahaba 16*	234.3	157.9	3765	4507	5208	3064	8272
Sahaba 17	259.7	184.4	4784	5272	6069	3987	10056
Sahaba 19*	313.7	285.1	7342	8378	8638	7082	15720
Sahaba 20	310.0	235.1	7134	7407	7726	6816	14542
Sahaba 22	258.5	223.9	5810	4730	5812	4727	10539
Sahaba 25*	237.4	180.8	5152	3560	5321	3391	8712
Sahaba 28*	185.6	164.7	2630	2905	3212	2323	5535
Sahaba 29*	348.2	309.0	9748	9464	10054	9158	19212
Sahaba 33*	199.6	180.9	3193	3224	3322	3095	6417
Sahaba 37	207.3	167.1	4017	2712	4020	2708	6728
Sahaba 38*	339.7	299.7	8319	9965	10000	8285	18285
Sahaba 39*	336.3	306.7	9078	9106	9782	8402	18184
Sahaba 40*	352.8	309.0	10323	9289	10512	9100	19612
Sahaba 41*	273.6	207.5	5928	5440	5953	5414	11368
Sahaba 42*	317.8	292.8	6641	9963	10135	6469	16604
Sahaba 102*	269.0	233.6	5413	6352	6611	5154	11765
Wadi Halfa 11*	166.3	149.6	2319	2263	2949	1633	4582
Wadi Halfa 12*	297.3	280.3	6982	7145	7295	6832	14128
Wadi Halfa 13*	221.6	187.0	3677	4163	4195	3644	7839
Wadi Halfa 15	168.5	146.6	2986	1673	3013	1646	4659
Wadi Halfa 20*	231.6	163.3	4120	3827	4765	3183	7948
Wadi Halfa 24*	348.3	320.5	9732	9712	9845	9600	19444
Wadi Halfa 25*	293.9	199.6	6577	5864	7111	5330	12441
Wadi Halfa 31*	355.0	324.3	9952	10318	11152	9118	20270
Wadi Halfa 34*	299.2	272.4	6131	8431	8893	5669	14562
Wadi Halfa 36*	230.0	217.9	4812	3854	4830	3836	8666
Wadi Halfa 37*	371.0	330.5	10028	11818	11824	10022	21846

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity; J: polar moment of area. * indicates that the specimen provides asymmetry for the 35% section.

Table S3a: Left humeral mid-distal (35%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; Neandertals and Middle Paleolithic modern humans.

Neandertals	**TA 35% L**[1]	**CA 35% L**	**Ix 35% L**	**Iy 35% L**	**Imax 35% L**	**Imin 35% L**	**J 35% L**
La Chapelle-aux-S. 1	267.7	219.9	6270	5305	6292	5282	11575
La Ferrassie 1	247.0	206.7	6011	3824	6015	3820	9835
Kebara 2	330.0	237.1	9086	7186	9397	6875	16272
St.-Césaire 1	242.0	188.6	5148	4071	5407	3812	9219
Shanidar 6[2]	187.1	147.2			3329	2163	5492
Spy 2	218.4	177.0	4268	3398	4549	3193	7742
Tabun 1	205.9	174.2	3982	2810	4032	2760	6792
Middle Paleolithic Modern Humans							
Skhul 2	178.6	139.4	2609	2336	2769	2176	4945
Skhul 4	254.6	243.0	5692	4712	5799	4605	10404
Skhul 5	276.4	195.5	5076	6073	6073	5075	11148
Skhul 7	164.1	123.5	2314	1779	2349	1743	4093

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity.

[2] The Shanidar 6 35% values were estimated from its 43% section (Trinkaus and Churchill, 1999).

Table S3b: Left humeral mid-distal (35%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; Early Upper Paleolithic modern humans.

Early Upper Paleolithic	**TA 35% L**[1]	**CA 35% L**	**Ix 35% L**	**Iy 35% L**	**Imax 35% L**	**Imin 35% L**	**J 35% L**
Barma Grande 5[2]	309.1	237.7	8517	6117	8553	6082	14635
Bausu da Ture 1	322.8	255.1	9244	7133	9422	6955	16377
Bausu da Ture 2	312.0	234.5	8125	6732	8734	6122	14856
Cro-Magnon 1 (4294)[2]	318.1	227.2	8497	6857			15355
Cro-Magnon 4293	226.6	160.2	4709	3028	4858	2879	7737
Dolní Věstonice 3	189.3	139.8	3286	2174	3298	2162	5460
Dolní Věstonice 13	262.2	193.6	5530	4979	5952	4558	10509
Dolní Věstonice 14	237.0	173.7	5318	3348	5384	3282	8666
Dolní Věstonice 16	267.0	195.8	5907	4767	5915	4759	10674
Grotte-des-Enfants 4[2]	310.8	230.0	8001	6597	8195	6403	14597
Grotte-des-Enfants 5[2]	222.3	145.8	4014	3107	4404	2718	7121
Mittlere Klause 1[2]	274.6	205.7	5999	5450			11448
Nazlet Khater 2[3]	287.1	238.1	6120	6913	6961	6072	13033
Nahal En'Gev 1	142.8	135.0	1803	1507	1889	1420	3310
Paglicci 25[2]	251.3	204.9	5592	4381	5786	4186	9973
Pataud 3	250.8	190.0	4931	4745			9676
Pataud 5	289.6	210.3	6843	5668	6846	5666	12512
Paviland 1	237.9	179.4	4890	3776	5143	3523	8666
Pavlov 1	299.1	198.1	6473	6141	6899	5715	12614
Sunghir 1	299.6	198.6	7359	5590	7401	5548	12948
Tianyuan1	247.0	208.9	5138	4482	5230	4389	9619

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity.

[2] Data from Churchill, 1994; values for specimens lacking Imax and Imin derive from cortical thicknesses and ellipse formulae.

[3] Data from Crevecoeur, 2008.

Table S3c: Left humeral mid-distal (35%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; West Eurasia Late Upper Paleolithic modern humans.

Western Eurasia Late Upper Paleolithic	**TA 35% L**[1]	**CA 35% L**	**Ix 35% L**	**Iy 35% L**	**Imax 35% L**	**Imin 35% L**	**J 35% L**
Arene Candide 2[2]	219.8		4548	2944	4561	2929	7490
Arene Candide 3	249.2	212.1	5308	4668	5617	4360	9977
Arene Candide 4[2]	229.3		3987	4125	4692	3417	8108
Arene Candide 5[2]	274.2		6326	5355	6509	5165	11674
Arene Candide 10[2]	267.1		5332	5522	5974	4872	10846
Arene Candide 12[2]	232.3		4465	3863	4517	3806	8323
Arene Candide 14	230.2		4325	3863	4326	3856	8182
Cap Blanc 1[3]	225.5	149.5	4372	3093			7465
Chancelade 1[3]	256.9	203.7	4693	5414			10107
Continenza 1[2]	336.5		9002	8232	9499	7721	17220
Ein Gev 1	236.9	206.5	4895	4043	5044	3894	8939
Lafaye 1	273.3	207.3	6087	5270	6088	5269	11357
Laugerie Basse unn. [3]	246.9	176.0	5022	3896			8918
Mataha F-81[4]	205.3	181.9	3442	3248	3569	3121	6690
Oberkassel 1	369.9	259.0	9998	10097	10349	9646	20095
Oberkassel 2	228.3	154.7	4260	3292	4349	3203	7552
Ohalo 2	239.9	193.5	4903	4038	4903	4038	8941
Romanelli 1[3]	281.5	222.3	7463	5286			12749
Romanelli 4[3]	274.0	183.6	5298	5660			10958
Romito 3[3]	240.0	205.1	4919	4142			9062
Romito 4[3]	231.3	195.2	4620	3811			8432
St-Germain-la-R. 4[3]	269.0	191.9	6384	4431			10814
San Teodoro 1[2]	354.7		9545	9761	10538	8751	19289
Villabruna 1[5]	264.7	226.7	5583	5510	5702	5391	11093

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity.
[2] CSG calculated from periosteal moulds and regression equations (Sparacello and Pearson, 2010).
[3] Data from Churchill, 1994; values for specimens lacking Imax and Imin derive from cortical thicknesses and ellipse formulae.
[4] Data from J.T. Stock, pers. comm. (Stock et al., 2005).
[5] Data from G. Vercellotti, pers. comm. (Vercellotti et al., 2008).

Table S3d: Left humeral mid-distal (35%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; East Eurasia Late Upper Paleolithic modern humans.

Eastern Eurasia Late Upper Paleolithic	**TA 35% L**[1]	**CA 35% L**	**Ix 35% L**	**Iy 35% L**	**Imax 35% L**	**Imin 35% L**	**J 35% L**
Minatogawa 1[2]	252.1	198.1	4951	4811	5299	4462	9761
Minatogawa 2[2]	188.9	140.9	2558	2774	2920	2412	5332
Minatogawa 3[2]	192.6	155.3	2907	2912	3107	2712	5819
Minatogawa 4[2]	240.6	166.4	4343	4059	4509	3892	8402
Tam Hang 2	178.5	141.5	2804	2177	2916	2065	4981
Tam Hang 3	198.3	144.5	3743	2492	4194	2042	6235
Tam Hang 7	209.5	139.5	3644	2551	362	2523	6195
Tam Hang 11	246.5	159.0	3449	3465	3674	3241	6915
Tam Hang 13	202.3	150.3	3933	2390	4014	2308	6323
Tam Hang 14	239.3	200.9	5565	3779	5800	3544	9344

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity.
[2] Data from T. Kimura, pers. comm. (Kimura and Takahashi, 1992).

Table S3e: Left humeral mid-distal (35%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; North Africa Late Upper Paleolithic modern humans.

North Africa Late Upper Paleolithic	TA 35% L[1]	CA 35% L	Ix 35% L	Iy 35% L	Imax 35% L	Imin 35% L	J 35% L
Afalou 2	304.7	267.7	6517	8461	8491	6487	14977
Afalou 3	281.7	219.4	6494	5742	6679	5557	12236
Afalou 10	295.5	249.0	7331	6374	7359	6346	13704
Afalou 11	363.8	270.8	9895	10050	10352	9593	19945
Afalou 13	304.4	243.6	7101	7419	7457	7063	14520
Afalou 25	299.2	264.9	6752	7430	7456	6726	14182
Afalou 27	242.2	187.1	5003	3979	5046	3937	8983
Afalou 28	345.0	287.2	8717	10456	11863	7310	19173
Sahaba 10	285.3	242.6	5699	7181	7359	5522	12880
Sahaba 15	220.0	180.3	4137	3385	4142	3381	7522
Sahaba 16	224.9	161.2	3423	4073	4079	3416	7495
Sahaba 19	271.5	231.1	5625	6097	6140	5582	11722
Sahaba 21	226.5	194.3	4748	3550	4994	3304	8298
Sahaba 22					6400	3880	
Sahaba 25	236.2	184.2	4170	4351	4667	3853	8520
Sahaba 28	195.1	166.8	2863	3207	3330	2740	6070
Sahaba 29	395.2	351.3	12071	12630	12922	11779	24701
Sahaba 33	199.8	172.1	2846	3522	3569	2799	6368
Sahaba 38	306.8	266.7	7918	6925	7920	6923	14843
Sahaba 39	261.2	248.0	5751	5291	5894	5148	11042
Sahaba 40	321.8	268.4	8697	7441	8776	7363	16139
Sahaba 41	271.0	213.3	5757	5478	5986	5249	11235
Sahaba 42	305.5	265.7	7700	7384	8142	6942	15084
Sahaba 102	242.8	222.2	4343	5087	5317	4113	9430
Wadi Halfa 1	249.1	224.2	4914	5341	6477	3778	10254
Wadi Halfa 2	309.9	248.2	7397	7336	7409	7324	14733
Wadi Halfa 3	303.9	278.4	8283	6629	8356	6556	14912
Wadi Halfa 6	270.4	236.1	5887	5665	6061	5491	11552
Wadi Halfa 11	193.0	166.7	2857	3085	3240	2702	5942
Wadi Halfa 12	254.9	239.6	5346	5256	5754	4848	10602
Wadi Halfa 13	219.5	186.6	3569	4209	4560	3218	7778
Wadi Halfa 14	193.6	167.0	3350	2601	3490	2462	5952
Wadi Halfa 20	215.1	143.3	3530	3033	3718	2845	6563
Wadi Halfa 23	302.6	241.7	6227	8008	8105	6130	14235
Wadi Halfa 24	303.5	242.7	7487	6878	7896	6470	14366
Wadi Halfa 25	270.8	206.5	6411	4784	6762	4434	11195
Wadi Halfa 26	307.8	242.9	7039	7473	7538	6974	14512
Wadi Halfa 28	284.9	200.1	5918	5921	6213	5627	11840
Wadi Halfa 31	278.1	253.9	7752	4860	7803	4810	12612
Wadi Halfa 34	273.0	248.7	7172	4912	7201	4883	12084
Wadi Halfa 36	256.3	238.2	5459	5239	5999	4699	10698
Wadi Halfa 37	278.8	244.0	6780	5640	6928	5492	12420

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity.

Table S4a: Right humeral midshaft (50%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; Neandertals and Middle Paleolithic modern humans.[1]

Neandertals	**TA 50% R**	**CA 50% R**	**Ix 50% R**	**Iy 50% R**	**Imax 50% R**	**Imin 50% R**	**J 50% R**
La Chapelle-aux-S. 1*	384.9	285.4	11499	11068	13588	8979	22567
La Ferrassie 1*	322.6	226.8	9663	6601	11047	5217	16263
La Ferrassie 2	202.7	125.3	3633	2453	4193	1892	6085
Kebara 2[2]*					17189	9779	26968
Lezetxiki 1[3]	300.9	223.4	7811	6196	8636	5371	14008
Oliveira 7[2]					12990	7790	20780
Palomas 92[2]					4670	3664	8334
Palomas 96*	183.3	160.5	3130	2462	3705	1887	5592
La Quina 5*	337.7	264.4	8482	9542	11398	6626	18024
Regourdou 1	326.0	265.9	8626	8462	11055	6032	17087
Shanidar 3	354.9	273.4	10887	9250	13193	6944	20137
Shanidar 4	406.1	301.2	14772	9772	14787	9757	24544
Shanidar 6[2]					5823	3304	9127
Spy 1[2]*					6334	3564	9898
Spy 2*	326.2	273.6	10027	7844	12091	5780	17871
Tabun 1	209.4	184.5	3938	3077	4040	2975	7016
Middle Paleolithic Modern Humans							
Qafzeh 8	381.4	327.4	10061	13340	14567	8834	23401
Qafzeh 9	326.0	251.5	9668	6678	9777	6569	16346
Skhul 2	190.7	130.0	3523	2014	3591	1946	5537
Skhul 4[2]*					10179	7071	17250
Skhul 5*	315.9	232.1	7444	7484	8492	6436	14928
Skhul 7[2]*					4333	2293	6626

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity. * indicates that the specimen provides asymmetry for the 50% section.

[2] Imax and J were estimated from midshaft maximum and minimum diameters using least squares regressions based on a pooled Eurasian Late Pleistocene humeri providing both CSG parameters and diameters (Ln(Imax) = 3.090 x Ln(MaxDia) + 0.386 x Ln(MinDia) – 1.62, n = 80, r^2 = 0.879, and Ln(J) = 2.590 x Ln(MaxDia) + 0.836 x Ln(MinDia) – 0870, n = 83, r^2 = 0.862 respectively); Imin = J – Imax.

[3] Data from Churchill, 1994.

Table S4b: Right humeral midshaft (50%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; Early Upper Paleolithic modern humans.[1]

Early Upper Paleolithic	TA 50% R[1]	CA 50% R	Ix 50% R	Iy 50% R	Imax 50% R	Imin 50% R	J 50% R
Bausu da Ture 2*	423.1	316.8	14375	13083	16878	10579	27457
Caviglione 1[2]					10073	6493	16566
Cro-Magnon 1 (4294)*	341.0	246.0	7679	9804	10631	6852	17483
Cro-Magnon 4296[2]					10330	6263	16594
Dolní Věstonice 3*	222.5	143.0	4092	2938	4124	2906	7030
Dolní Věstonice 13*	376.5	268.0	9741	11272	11774	9239	21013
Dolní Věstonice 14*	364.8	230.0	8823	9664	10885	7602	18487
Dolní Věstonice 16*	348.9	182.8	7848	7780	9917	5712	15629
Grotte-des-Enfants 4[3]*	444.2	271.0	13989	13747	17592	10145	27736
Mladeč 24	271.9	181.1	6240	4802	7248	3794	11042
Nazlet Khater 2[4]*	322.2	261.0	8165	7945	8214	7896	16110
Nahal En'Gev 1*	181.5	165.4	3058	2359	3210	2207	5417
Ostuni 1[2]*					7457	5312	12769
Paglicci 25[3]*	323.2	222.5	7959	7541	9570	5929	15499
Pataud 3*	267.2	190.9	5202	5753	6983	3972	10956
Pavlov 1*	370.8	252.7	9295	10967	12644	7618	20262
Předmostí 3[2]*					8519	5559	14078
Předmostí 4[2]*					8141	4617	12758
Předmostí 9[2]*					5416	4214	9630
Předmostí 10[2]*					6208	4277	10485
Předmostí 14[2]*					7218	4680	11898
Sunghir 1*	371.5	251.9	11087	9057	11940	8203	20144
Tianyuan1*	380.1	307.2	9564	12974	13511	9027	22538

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity. * indicates that the specimen provides asymmetry for the 50% section.
[2] Estimated from maximum and minimum midshaft diameters as indicated in Table S4a.
[3] Data from Churchill, 1994;
[4] Data from Crevecoeur, 2008.

Table S4c: Right humeral midshaft (50%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; West Eurasia Late Upper Paleolithic modern humans.[1]

Western Eurasia Late Upper Paleolithic	TA 50% R	CA 50% R	Ix 50% R	Iy 50% R	Imax 50% R	Imin 50% R	J 50% R
Arene Candide 2[2]*	368.6		13652	7564	13702	7517	21219
Arene Candide 3*	355.9	276.5	9037	10855	10562	7025	17587
Arene Candide 4[2]*	363.5		9272	11607	13559	7312	20871
Arene Candide 5[2]*	338.5		9319	8872	11853	6332	18185
Arene Candide 10[2]	244.6		4027	5488	6131	3380	9511
Arene Candide 12[2]*	368.2		11644	9939	14234	7344	21566
Arene Candide 13[3]					4023	2248	6359
Cap Blanc 1[3]*					8160	4664	12824
Chancelade 1[3]*					13968	7641	21609
Continenza 1[2]*	324.9		10374	6123	10392	6104	16496
Ein Gev 1*	299.9	226.2	7108	6513	7691	5930	13621
Laugerie Basse un.[4]*	377.8	298.4	11087	11798			22885
Mataha F-81[5]*	272.9	226.9	5729	6204	7510	4423	11933
Neve David 1	319.9	275.3	7980	8618	10449	6149	16598
Oberkassel 1*	334.0	233.6	7354	9489	10312	6530	16843
Oberkassel 2*	250.1	160.8	4124	4503	4817	3809	8627
Ohalo 2*	330.2	223.3	7153	8727	9666	6214	15881
Peyrat 5[3]*					10286	5869	16155
Placard 16[4]	327.5	236.6	8211	8019			16231
Romanelli 1[4]*	342.1	278.5	9068	9512			18581
Romito 1[3]*					3438	2239	5677
Romito 3[3]					12645	6958	19603
Romito 4[3]*					9450	5236	14687
Romito 5[3]*					5048	3220	8268
Romito 6[3]*					5760	3155	8914
St-Germain-la-R. 4[3]*					8333	5088	13421
San Teodoro 1[3]					14205	11004	25209
Villabruna 1[6]*	338.0	279.0			10966	7459	18425

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity. * indicates that the specimen provides asymmetry for the 50% section.
[2] CSG calculated from periosteal molds and regression equations (Sparacello and Pearson, 2010).
[3] Estimated from maximum and minimum midshaft diameters as indicated in Table S4a.
[4] Data from Churchill, 1994, from cortical thicknesses and ellipse formulae.
[5] Data from J.T. Stock, pers. comm. (Stock et al., 2005).
[6] Data from G. Vercellotti, pers. comm. (Vercellotti et al., 2008).

Table S4d: Right humeral midshaft (50%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; East Eurasia Late Upper Paleolithic modern humans.[1]

Eastern Eurasia Late Upper Paleolithic	TA 50% R	CA 50% R	Ix 50% R	Iy 50% R	Imax 50% R	Imin 50% R	J 50% R
Minatogawa 1[2]*	274.8	182.7	5014	6094	6974	4133	11107
Minatogawa 2[2]*	202.2	153.6	2773	3554	3957	2369	6326
Minatogawa 3[2]*	189.5	160.4	3273	2530	3671	2132	5803
Minatogawa 4[2]*	250.2	179.0	5666	4698	7534	2830	10364
Tam Hang 2*	210.9	165.8	3369	3656	4610	2415	7025
Tam Hang 3*	211.6	155.3	4043	2870	4350	2563	6913
Tam Hang 7*	236.6	164.3	5059	3308	5373	2994	8367
Tam Hang 11*	234.4	171.0	4815	3549	5448	2915	8363
Tam Hang 13*	227.9	174.8	5615	2792	5872	2534	8406
Tam Hang 14*	283.1	218.0	6944	5872	8331	4486	12817

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity. * indicates that the specimen provides asymmetry for the 50% section.

[2] Data from T. Kimura, pers. comm. (Kimura and Takahashi, 1992).

Table S4e: Right humeral midshaft (50%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; North Africa Late Upper Paleolithic modern humans.[1]

North Africa Late Upper Paleolithic	TA 50% R	CA 50% R	Ix 50% R	Iy 50% R	Imax 50% R	Imin 50% R	J 50% R
Afalou 1	348.6	294.3	8828	11431	13752	6506	20258
Afalou 2*	377.1	324.3	11357	11544	13992	8909	22901
Afalou 3*	350.9	255.6	9817	8962	11608	7170	18778
Afalou 10*	340.2	249.6	9169	9594	13020	5743	18763
Afalou 13*	398.8	327.5	12272	13049	15745	9576	25321
Afalou 25*	333.1	241.8	8378	8536	10584	6330	16914
Afalou 27*	353.3	256.3	9482	9999	12991	6489	19480
Afalou 28*	400.9	326.5	13286	11958	14933	10311	25244
Sahaba 10*	322.4	289.8	7766	8878	9732	6913	16644
Sahaba 15*	249.6	213.0	5118	5156	6740	3534	10274
Sahaba 16*	247.9	183.1	4721	4830	6194	3358	9551
Sahaba 19*	353.9	293.4	8407	11431	12068	7770	19838
Sahaba 20	335.1	255.1	8276	9114	10884	6506	17390
Sahaba 22*	304.0	248.3	6352	8638	9771	5219	14990
Sahaba 25*	297.7	219.5	6734	6924	8553	5104	13658
Sahaba 28*	192.5	173.3	2988	3121	3873	2236	6108
Sahaba 29*	358.1	319.2	11959	8953	12960	7952	20912
Sahaba 33*	225.0	194.7	4302	3851	4885	3268	8153
Sahaba 37	236.9	182.9	4624	4133	5523	3234	8757
Sahaba 38*	345.0	298.2	8895	9754	9866	8783	18649
Sahaba 39*	337.5	307.8	7345	11111	11277	7179	18455
Sahaba 40*	379.0	291.6	10433	11472	12365	9540	21904
Sahaba 41*	316.0	248.1	7347	8270	9366	6251	15617
Sahaba 42*	373.2	320.4	9983	12397	13750	8630	22380
Sahaba 102*	274.4	227.7	6375	5538	7067	4845	11912
Wadi Halfa 2*	358.9	280.2	9250	10432	8662	11020	19682
Wadi Halfa 11*	213.8	170.8	3553	3789	2568	4774	7342
Wadi Halfa 12*	295.9	269.2	7222	6847	6219	7851	14070
Wadi Halfa 13*	204.5	183.9	3262	3420	3033	3649	6682
Wadi Halfa 15*	211.9	165.9	3954	3035	2752	4237	6989
Wadi Halfa 20*	223.0	170.1	3643	4143	2761	5026	7787
Wadi Halfa 24*	403.8	323.4	11030	14329	10357	15002	25359
Wadi Halfa 25*	296.6	203.0	5522	7763	4546	8739	13285
Wadi Halfa 26*	356.1	281.3	10206	9238	8179	11265	19444
Wadi Halfa 28*	318.8	235.9	8065	7344	5863	9546	15409
Wadi Halfa 31*	359.7	308.7	10384	10519	7737	13166	20903
Wadi Halfa 32*	247.5	212.0	5274	4560	3884	5950	9834
Wadi Halfa 34*	343.7	270.5	10109	8494	6785	11817	18602
Wadi Halfa 36*	259.1	232.0	6723	4616	3705	7634	11339
Wadi Halfa 37*	372.4	326.4	9492	13617	7629	15480	23109

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity. * indicates that the specimen provides asymmetry for the 50% section.

Table S5a: Left humeral midshaft (50%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; Neandertals and Middle Paleolithic modern humans.

Neandertals	**TA 50% L**[1]	**CA 50% L**	**Ix 50% L**	**Iy 50% L**	**Imax 50% L**	**Imin 50% L**	**J 50% L**
Amud 1					11687	6411	18098
La Chapelle-aux-S. 1	277.9	221.9	7018	5572	8078	4512	12590
La Ferrassie 1	255.7	191.3	6911	3720	7276	3355	10631
Kebara 2	341.1	251.9	11171	7079	12020	6230	18250
Palomas 16	242.9	186.4	6591	3068	6593	3066	9659
Palomas 96	203.5	171.3	4626	2253	4629	2250	6879
La Quina 5	228.1	170.7	4868	3157	4917	3108	8024
St.-Césaire 1[2]					9431	5724	15155
Spy 1[2]					6580	3351	9931
Spy 2	242.1	191.0	5799	3922	6478	3242	9720
Middle Paleolithic Modern Humans							
Skhul 4	279.4	257.2	6290	6301	7170	5421	12591
Skhul 5	286.7	176.7	5740	5763	6947	4556	11503
Skhul 7[2]					3564	2287	5851

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity.
[2] Estimated from maximum and minimum midshaft diameters as indicated in Table S4a.

Table S5b: Left humeral midshaft (50%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; Early Upper Paleolithic modern humans.

Early Upper Paleolithic	**TA 50% L**[1]	**CA 50% L**	**Ix 50% L**	**Iy 50% L**	**Imax 50% L**	**Imin 50% L**	**J 50% L**
Barma Grande 5[2]	328.8	214.4	8091	7642	10001	5731	15733
Bausu da Ture 2	342.3	246.7	8664	8941	10633	6972	17605
Cro-Magnon 4293	280.8	217.5	6135	5999	5331	3319	12134
Dolní Věstonice 3	199.8	133.0	3653	2242	3747	2148	5895
Dolní Věstonice 13	280.6	186.7	5204	6273	6791	4686	11477
Dolní Věstonice 14	266.3	170.8	5259	4884	6159	3985	10144
Dolní Věstonice 16	394.1	188.7	5668	6460	6778	5349	12128
Grotte-des-Enfants 4[2]	336.1	206.5	7750	8501	10701	5550	16251
Grotte-des-Enfants 5[2]	250.9	144.1	4159	4559	5794	2925	8719
Mittlere Klause 1[2]	292.4	200.8	6351	6138			12489
Nazlet Khater 2[3]	288.7	239.5	7300	5854	7305	5849	13154
Ostuni 1[4]					6846	4875	11725
Paglicci 25[2]	293.7	208.1	6160	6735	7704	5192	12895
Pataud 3	279.4	200.3	5187	6548	6535	4190	11735
Pataud 5	293.3	216.7	6682	6384	7628	5438	13066
Paviland 1	256.7	195.9	4689	5442	5987	4145	10131
Pavlov 1	344.1	219.9	7812	9216	10685	6343	17028
Předmostí 3[4]					7379	5102	12480
Předmostí 4[4]					6610	5402	12011
Předmostí 9[4]					3670	2872	6543
Předmostí 10[4]					6064	3903	9967
Předmostí 14[4]					6208	4277	10485
Sunghir 1	348.7	186.7	8062	7318	8064	7316	15380
Tianyuan1	283.9	219.1	6018	6694	7747	4961	12708

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity.

[2] Data from Churchill, 1994; values for the specimen lacking Imax and Imin derive from cortical thicknesses and ellipse formulae.

[3] Data from Crevecoeur, 2008.

[4] Estimated from maximum and minimum midshaft diameters as indicated in Table S4a.

Table S5c: Left humeral midshaft (50%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; West Eurasia Late Upper Paleolithic modern humans.

Western Eurasia Late Upper Paleolithic	**TA 50% L**[1]	**CA 50% L**	**Ix 50% L**	**Iy 50% L**	**Imax 50% L**	**Imin 50% L**	**J 50% L**
Arene Candide 2[2]	242.9		4749	4546	5900	3391	9292
Arene Candide 3	260.9	198.5	5871	4688	6428	4131	10559
Arene Candide 4[2]	276.3		5487	6651	7882	4250	12123
Arene Candide 5[2]	289.7		6935	6301	8454	4777	13231
Arene Candide 12[2]	264.0		7214	3983	7337	3861	11198
Arene Candide 14	248.5		4489	5029	5702	3811	9513
Cap Blanc 1[3]					7383	4182	11565
Chancelade 1[3]					7443	4765	12208
Continenza 1[2]	340.7		11161	6863	11286	6736	18022
Ein Gev 1	269.1	202.8	5593	5351	5913	5031	10944
Les Forges E546[3]					7309	4006	11315
Lafaye 1	284.0	222.0	6115	6457	7672	4899	12571
Laugerie Basse unn.[4]	291.9	203.6	7018	5725			12743
Mataha F-81	232.4	172.8	4470	3878	5234	3114	8348
Oberkassel 1	410.0	263.5	10488	13816	14873	9430	24304
Oberkassel 2	252.5	166.9	4738	4302	4888	4151	9040
Ohalo 2	257.6	180.5	5249	4615	5925	3939	9864
Peyrat 5					15921	9113	25034
Romanelli 1[4]	328.2	226.7	7143	6161			13304
Romanelli 4[4]	290.8	216.0	6250	6395			12645
Romito 1[3]					2267	1582	3849
Romito 4[3]					5915	3528	9444
Romito 5[3]					4042	2336	6378
Romito 6[3]					5098	2496	7594
St-Germain-la-R. 4[3]	291.0	194.8	5923	6407			12330
Villabruna 1[6]	271.0	237.0			6799	4780	11579

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity.
[2] CSG calculated from periosteal moulds and regression equations (Sparacello and Pearson, 2010).
[3] Estimated from maximum and minimum midshaft diameters as indicated in Table S4a.
[4] Data from Churchill, 1994 from cortical thicknesses and ellipse formulae.
[5] Data from J.T. Stock, pers. comm. (Stock et al., 2005).
[6] Data from G. Vercellotti, pers. comm. (Vercellotti et al., 2008).

Table S5d: Left humeral midshaft (50%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; East Eurasia Late Upper Paleolithic modern humans.

Eastern Eurasia Late Upper Paleolithic	**TA 50% L**[1]	**CA 50% L**	**Ix 50% L**	**Iy 50% L**	**Imax 50% L**	**Imin 50% L**	**J 50% L**
Minatogawa 1[2]	281.8	194.0	5485	6395	7432	4449	11881
Minatogawa 2[2]	193.5	138.8	2355	3266	3512	2159	5670
Minatogawa 3[2]	186.7	158.7	2840	2747	3437	2150	5587
Minatogawa 4[2]	242.2	171.9	3967	5063	5905	3126	9030
Tam Hang 2	190.7	142.8	2983	2699	3782	1900	5681
Tam Hang 3	228.8	152.4	4102	3473	4731	2844	7575
Tam Hang 7	207.8	145.2	3248	3165	4045	2368	6413
Tam Hang 11	244.8	160.9	4748	3853	5423	3178	8600
Tam Hang 13	224.6	194.2	4593	3779	5548	2825	8372
Tam Hang 14	274.9	225.1	5453	6515	7243	4724	11968

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity;
[2] Data from T. Kimura, pers. comm. (Kimura and Takahashi, 1992).

Table S5e: Left humeral midshaft (50%) cross-sectional geometric properties of the Late Pleistocene samples included in the study; North Africa Late Upper Paleolithic modern humans.

North Africa Late Upper Paleolithic	TA 50% L[1]	CA 50% L	Ix 50% L	Iy 50% L	Imax 50% L	Imin 50% L	J 50% L
Afalou 1							
Afalou 2	332.9	283.8	9272	8230	10005	7496	17501
Afalou 3	306.0	206.0	7288	6405	8280	5412	13693
Afalou 10	319.0	264.0	7562	8723	10372	5914	16286
Afalou 11	377.1	273.4	11217	10104	12580	8741	21321
Afalou 13	339.1	261.5	8923	9417	11291	7049	18340
Afalou 25	339.6	282.4	9102	9149	10962	7289	18251
Afalou 27	297.4	193.3	6364	6265	7590	5039	12629
Afalou 28	349.3	290.7	8659	10451	10611	8498	19109
Sahaba 10	269.0	234.5	4993	6726	7224	4495	11719
Sahaba 15	240.4	197.7	4303	4712	5098	3917	9015
Sahaba 16	236.9	170.7	4412	4072	5303	3181	8484
Sahaba 19	298.3	249.3	6041	8060	8442	5659	14101
Sahaba 21	238.8	192.2	4146	5413	6741	2818	9559
Sahaba 22	274.7	227.6	5342	6761	7791	4312	12104
Sahaba 25	262.8	190.3	4279	6215	6520	3975	10494
Sahaba 28	215.2	189.9	3498	4029	4597	2931	7527
Sahaba 29	414.2	365.9	13338	14035	16267	11105	27372
Sahaba 33	221.1	187.3	4370	3507	4715	3162	7877
Sahaba 38	316.1	272.8	8428	7416	9150	6694	15844
Sahaba 39	271.0	253.8	5629	6181	6859	4950	11809
Sahaba 40	375.1	288.1	9235	12405	12990	8650	21641
Sahaba 41	325.1	253.1	7000	9331	9773	6558	16331
Sahaba 42	349.3	302.7	9339	9859	9867	9331	19198
Sahaba 102	247.2	206.9	4544	5116	5529	4130	9659
Wadi Halfa 1	239.2	211.0	3741	5646	3345	6041	9387
Wadi Halfa 2	327.4	258.8	7940	8250	7744	8446	16190
Wadi Halfa 3	322.7	285.4	6595	10544	6065	11074	17139
Wadi Halfa 6	295.1	240.0	7662	6366	4904	9124	14028
Wadi Halfa 7	240.8	181.2	4011	4732	3475	5268	8743
Wadi Halfa 11	191.0	162.5	2980	2902	2203	3680	5882
Wadi Halfa 12	269.1	248.0	5721	6023	5021	6723	11743
Wadi Halfa 13	231.2	195.8	4075	4358	4057	4376	8433
Wadi Halfa 14	204.2	178.8	3824	2821	2650	3994	6644
Wadi Halfa 15	220.4	174.5	2861	4798	2804	4855	7660
Wadi Halfa 20	249.5	178.3	5100	4287	3624	5763	9387
Wadi Halfa 23	320.0	240.0	7188	8071	7171	8088	15259
Wadi Halfa 24	363.8	295.2	9797	10593	9445	10945	20390
Wadi Halfa 25	304.3	221.7	5779	8291	5373	8698	14070
Wadi Halfa 26	344.3	279.3	8947	9384	7757	10574	18331
Wadi Halfa 28	317.0	234.7	6806	8417	6044	9178	15222
Wadi Halfa 31	308.5	267.3	7522	7506	6480	8549	15029
Wadi Halfa 32	236.4	209.2	3492	5639	3426	5705	9131
Wadi Halfa 34	322.0	260.9	7989	8139	7231	8897	16129
Wadi Halfa 36	283.7	250.1	6575	6546	4929	8192	13121
Wadi Halfa 37	300.9	278.1	7139	7509	6624	8024	14648

[1] TA: total area; CA: cortical area; Ix: antero-posterior bending rigidity; Iy: medio-lateral bending rigidity; Imax: maximum bending rigidity; Imin: minimum bending rigidity.

Section II: Paleopathological Considerations

Four of the Late Pleistocene partial skeletons providing bilateral humeral cross-sectional properties, Barma Grande 2, Dolní Věstonice 15, Feldhofer 1 and Shanidar 1, are not included. The marked degrees of humeral diaphyseal asymmetry of three of them are clearly not normal. The etiology of the Barma Grande 2 asymmetry is not known, but it resulted in exceptional hypertrophy of right humerus, possible atrophy of the left humerus, and asymmetries in the forearms (asymmetries in J: humerus 35% section: 170.5%; radius 50% section: 56.4%; ulna 50% section: 47.6%) (Churchill and Formicola, 1997; Sparacello, pers. observ.). Feldhofer 1 sustained a left cubital fracture that healed with marked distortion and osteoarthritis; the deformity resulted in limited cubital flexion-extension, right humeral hypertrophy, left humeral atrophy, and left forearm length undergrowth (humerus 35% J asymmetry: 116.8%) (Trinkaus et al., 1994; Smith et al., 2006). The right humerus of Shanidar 1 sustained multiple fractures, a probable distal metaphyseal amputation, and marked diaphyseal atrophy (humerus 65% J asymmetry: 889.1% (Trinkaus, 1983; Trinkaus and Churchill, 1999). The Dolní Věstonice 15 humeri do not exhibit an unusually elevated level of asymmetry for a Late Pleistocene individual (35% J: 70.0%; 50% J: 55.1%), but its multiple upper limb deformities indicate abnormal patterns (if not levels) of humeral loading (Trinkaus et al., 2006). None of these specimens is included in the analyses.

At the same time, there are four specimens with less pronounced upper limb abnormalities (Arene Candide 3, Chancelade 1, Oberkassel 1 and Ohalo 2), as well as two with pronounced asymmetries that might be considered abnormal (Arene Candide 2 and La Quina 5). All six of these specimens are included in the analysis. The Chancelade 1 abnormalities consist of ossifications of the right glenohumeral periarticular connective tissue and remodeling of the sternoclavicular articulation (Dastugue, 1969). Oberkassel 1 sustained a, long since fully healed, right distal ulnar fracture and ossification of the right coracoclavicular ligaments, neither of which resulted in the atrophy of any of the right upper limb diaphyses (Trinkaus, 2015; Slizewski, 2015). Ohalo 2 exhibits a proliferative ossification of the caudal costal cartilages and osteoarthritis of the right glenohumeral articulation (Hershkovitz et al., 1993), neither of which appears to be related to the marked asymmetry of the humeral diaphyses (35% J asymmetry: 47.8%; 50% J asymmetry: 61.0%), given that the other arm bones show little diaphyseal asymmetry and the smaller humeral diaphysis is left. Arene Candide 3 exhibits marked bowing of the right humerus and several other long bones, but no atrophy or hypotrophy, a condition that has been diagnosed as a form of adult-onset congenital rickets (Formicola, 1995), even though the curvatures of the left humerus and the femora are normal (if pronounced). Its humeral asymmetry indices (35% J asymmetry: 38.7%; 50% J asymmetry: 66.6%), however, are unexceptional for a Late Upper Paleolithic human.

The asymmetry of the La Quina 5 humeri has been suggested to be pathological since the original description of Martin (1923; cf. Vandermeersch, 1976; Trinkaus et al., 1994). However, the humeral articulations are bilaterally normal and symmetrical, and the left radius and ulna (the presumed affected side) are normal in morphology and hypertrophy (Trinkaus, 2016). The Arene Candide 2 skeleton sustained a femoral abnormality (bilateral lesser trochanter absence; Formicola et al., 1990; Formicola, 1995). However, its etiology is unclear, and there is no apparent connection with its pronounced level of humeral asymmetry (35% J asymmetry: 110.9%; 50% J asymmetry: 128.4%).

Consequently, the Barma Grande 2, Dolní Věstonice 15, Feldhofer 1 and Shanidar 1 humeri are not included in the asymmetry comparisons. However, the La Quina 5, Chancelade 1, Oberkassel 1, Ohalo 2 and Arene Candide 2 and 3 humeri are included, despite possible minor effects of abnormalities on their levels of asymmetry.

Section III. Sample and Sex Comparisons

Table S6. Sample statistics and pairwise comparisons significance values for the level of midshaft (50%) bilateral asymmetry in polar moments of area.

						Post-hoc pairwise comparisons significance level[1]			
50% J Asymmetry	**n**	**Mean**	**Median**	**SD**	**MPMH[2]**	**EUP**	**WELUP**	**NALUP**	**EELUP**
Neand	7	58.8	53.0	41.3	NS (NS)	NS (NS)	NS (NS)	NS ($p<0.05$)	$p<0.05$ ($p<0.05$)
Males	3	60.0	53.0	16.9	NS (NS)	NS (NS)	NS (NS)	NS ($p<0.05$)	NS (NS)
Females	1	23.0	23.0						
MPMH	3	26.7	29.8	12.2		NS (NS)	NS (NS)	NS (NS)	NS ($0.1<p<0.05$)
Males	2	33.4	33.4	5.1		NS (NS)	NS ($0.1<p<0.05$)	NS (NS)	NS (NS)
Females	1	13.2	13.2						
EUP	18	33.9	21.3	27.9			NS (NS)	NS (NS)	NS ($p<0.05$)
Males	12	45.3	39.1	27.5			NS (NS)	NS (NS)	NS ($p<0.05$)
Females	6	11.1	8.0	6.8			NS (NS)	NS (NS)	NS (NS)
Sex Dimorph[3]		$0.1<p<0.05$ ($p<0.01$)							
WELUP	22	48.4	45.9	30.8				$p<0.05$ ($p<0.001$)	$p<0.01$ ($p<0.001$)
Males	14	60.2	57.3	28.3				$p<0.05$ ($p<0.0015$)	$0.1<p<0.05$ ($p<0.05$)
Females	8	27.6	20.9	24.2				NS (NS)	NS (NS)
Sex Dimorph		NS ($p<0.05$)							
NALUP	37	23.0	21.6	15.2					NS ($p<0.05$)
Males	19	29.1	30.9	16.8					NS ($0.1<p<0.05$)
Females	18	16.6	15.5	10.1					NS (NS)
Sex Dimorph		NS ($p<0.05$)							
EELUP	10	11.1	8.3	9.5					
Males	2	7.0	7.0	0.1					
Females	8	12.1	10.6	10.5					
Sex Dimorph		NS (NS)							

Notes to Tables S6 and S7

[1] Non-parametric pairwise comparisons significance level: Kruskal-Wallis multiple comparisons of ranks (as a multiple comparison correction), with the pairwise Mann-Whitney U-Test in parentheses. Pairwise comparisons among time periods were performed with pooled sexes samples, and by sex; the level of significance refers to the subsample indicated in the column (pooled sexes, males or females).

[2] Sample acronyms: Neand: Neandertal; MPMH: Middle Paleolithic modern humans; EUP: Early Upper Paleolithic; WELUP: western Eurasia Late Upper Paleolithic; NALUP: north African Late Upper Paleolithic; EELUP: eastern Eurasia Late Upper Paleolithic.

[3] Non-parametric comparison of the sexes, by time period: Mann-Whitney U-Test using a Bonferroni multiple comparison correction; the p-value without the correction is provided in parentheses. It cannot be computed for Neandertal and MPMH samples given a sample of one for one of the sexes.

Table S7. Sample statistics and pairwise comparisons significance values for the level of mid-distal (35%) bilateral asymmetry in polar moment of area.

						Post-hoc pairwise comparisons significance level[1]		
35% J Asymmetry	**n**	**Mean**	**Median**	**SD**	**MPMH[2]**	**EUP**	**WELUP**	**NALUP**	**EELUP**
Neand	5	47.4	49.6	34.3	NS	NS	NS	NS	0.1<p<0.05 (p<0.05)
Males	3	42.7	49.6	18.4		NS	NS	NS	NS
Females	1	10.5	10.5						
MPMH	3	21.7	24.6	7.7		NS	NS	NS	NS (0.1<p<0.05)
Males	1	27.6	27.6						
Females	2	18.8	18.8	8.2		NS	NS	NS	NS
EUP	16	48.3	42.9	32.7			NS	NS (p<0.05)	p<0.01 (p<0.001)
Males	11	63.0	66.9	28.3			NS	NS (p<0.05)	0.1<p<0.05 (p<0.05)
Females	4	14.3	13.9	10.7			NS	NS	NS
Sex Dimorph[3]		0.1<p<0.05 (p<0.01)							
WELUP	20	45.8	39.1	29.7				NS (p<0.05)	p<0.001 (p<0.001)
Males	15	55.4	48.0	27.7				NS (0.1<p<0.05)	NS (p<0.05)
Females	5	16.8	14.5	9.8				NS	NS (0.1<p<0.05)
Sex Dimorph		p<0.05 (p<0.01)							
NALUP	31	27.9	23.9	23.7					NS (p<0.01)
Males	17	40.0	33.3	24.8					NS (0.1<p<0.05)
Females	14	13.2	10.7	10.8					NS
Sex Dimorph		p<0.01 (p<0.001)							
EELUP	10	8.8	4.9	9.9					
Males	2	7.0	7.0	8.0					
Females	8	9.2	4.9	10.8					
Sex Dimorph		NS (NS)							

Section IV. Humeral Dominant versus Non-Dominant and Asymmetry versus Body Size

Table S8. Least squares slopes for dominant versus non-dominant polar moments of area (Dom/Non-Dom), asymmetry values versus body mass (Asym/BM), and asymmetry values versus humeral articular length (Asym/HAL) for Late Pleistocene humans, for the total sample and for males and females separately. * indicates a slope significantly >1 for the Dom/Non-Dom comparisons and >0 for the Asym/BM mass comparisons, based on their 95% confidence intervals (CIs).

	Section	Slope	95% CI	r^2	n
Dom/Non-Dom					
All	35%	1.371*	1.106 – 1.541	0.754	85
	50%	1.263*	1.106 – 1.420	0.729	97
Female	35%	1.137*	1.040 – 1.235	0.947	34
	50%	1.135	0.979 – 1.290	0.845	42
Male	35%	1.011	0.735 – 1.287	0.536	49
	50%	0.908	0.657 – 1.159	0.513	52
Asym/BM					
All	35%	1.898*	1.344 – 2.451	0.423	66
	50%	1.362*	0.829 – 1.896	0.259	76
Female	35%	0.387	-0.016 – 0.790	0.160	23
	50%	0.140	-0.475 – 0.755	0.008	30
Male	35%	1.824*	0.697 – 2.951	0.211	42
	50%	1.342*	0.337 – 2.347	0.144	45
Asym/HAL					
All	35%	0.418*	0.190 – 0.646	0.153	76
	50%	0.209	-0.018 – 0.435	0.039	84
Female	35%	0.164*	0.007 – 0.321	0.151	28
	50%	-0.003	-0.264 – 0.257	<0.001	33
Male	35%	0.165	-0.181 – 0.511	0.021	46
	50%	-0.090	-0.427 – 0.246	0.006	49

Section V. Humeral Hypertrophy Comparisons

To assess the degrees of humeral diaphyseal hypertrophy across the Late Pleistocene samples and between males and females, humeral mid-distal (35%) and midshaft (50%) polar moments of area are plotted against body mass x articular length^2 (following Biewener, 1992). They are done separately for the dominant and non-dominant arms, as determined by the asymmetry in polar moments of area. The data are plotted by sample (Fig. S1) and by sex (Fig. S2); in the latter only specimens with reliable sex assignments are included.

Of the 86 specimens providing humeral diaphyseal polar moments of area, humeral length and a body mass estimate, twelve (14.0%) furnish humeral data for only one side. For those 12 specimens, the right side is assumed to be the dominant one, given the majority right-side dominance in the pooled sample (83.5%) as well as among recent humans (Raymond and Pontier, 2004). Therefore, ten of those twelve individuals should have been right-side dominant, and only two are likely to have been reversed. Any bias across the comparisons from this assumption should be minimal.

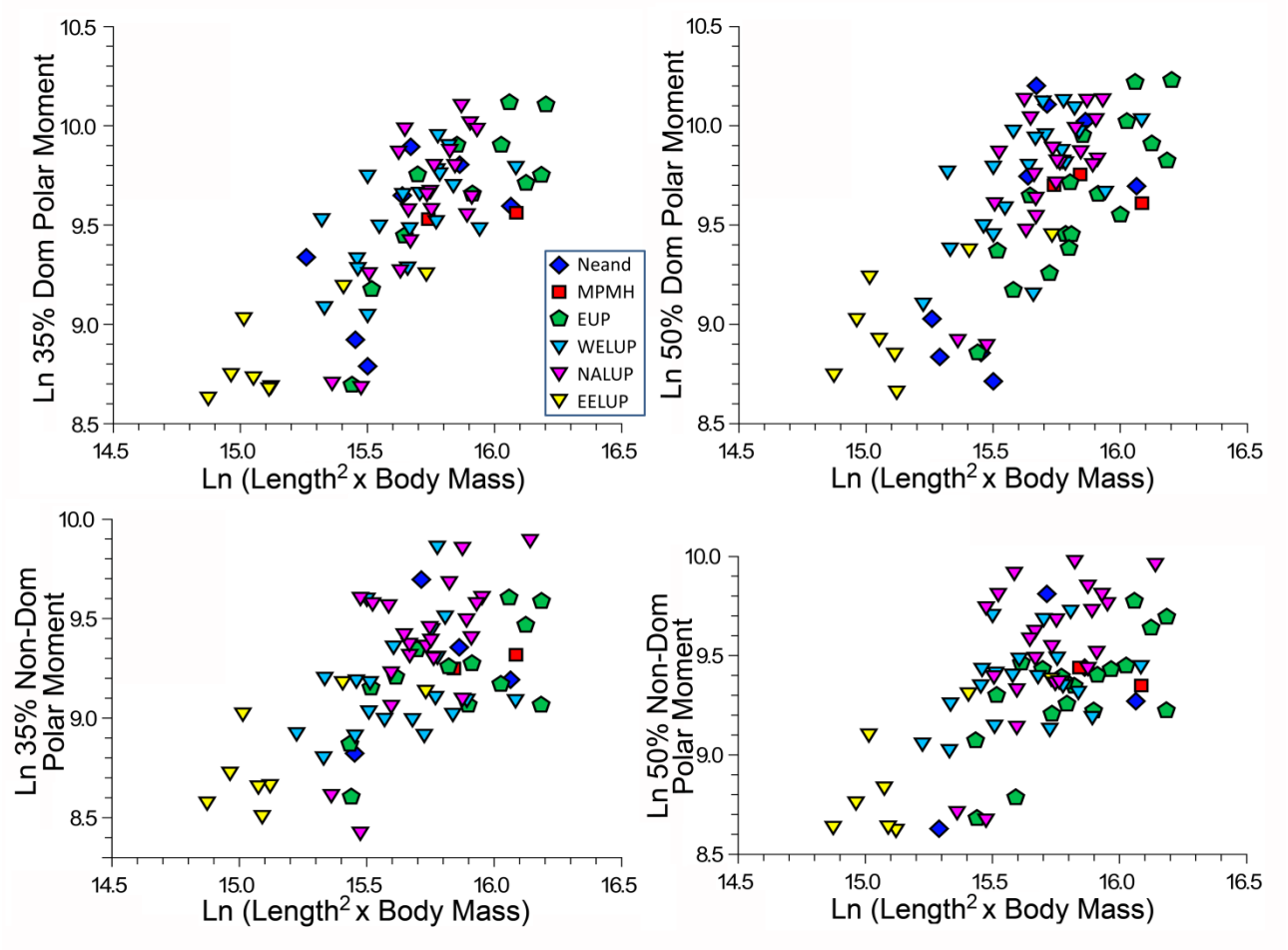

Figure S1. Bivariate plots of humeral polar moments of area versus body mass x length^2 by temporal and geographical sample for Eurasian and North African Late Pleistocene humeri.

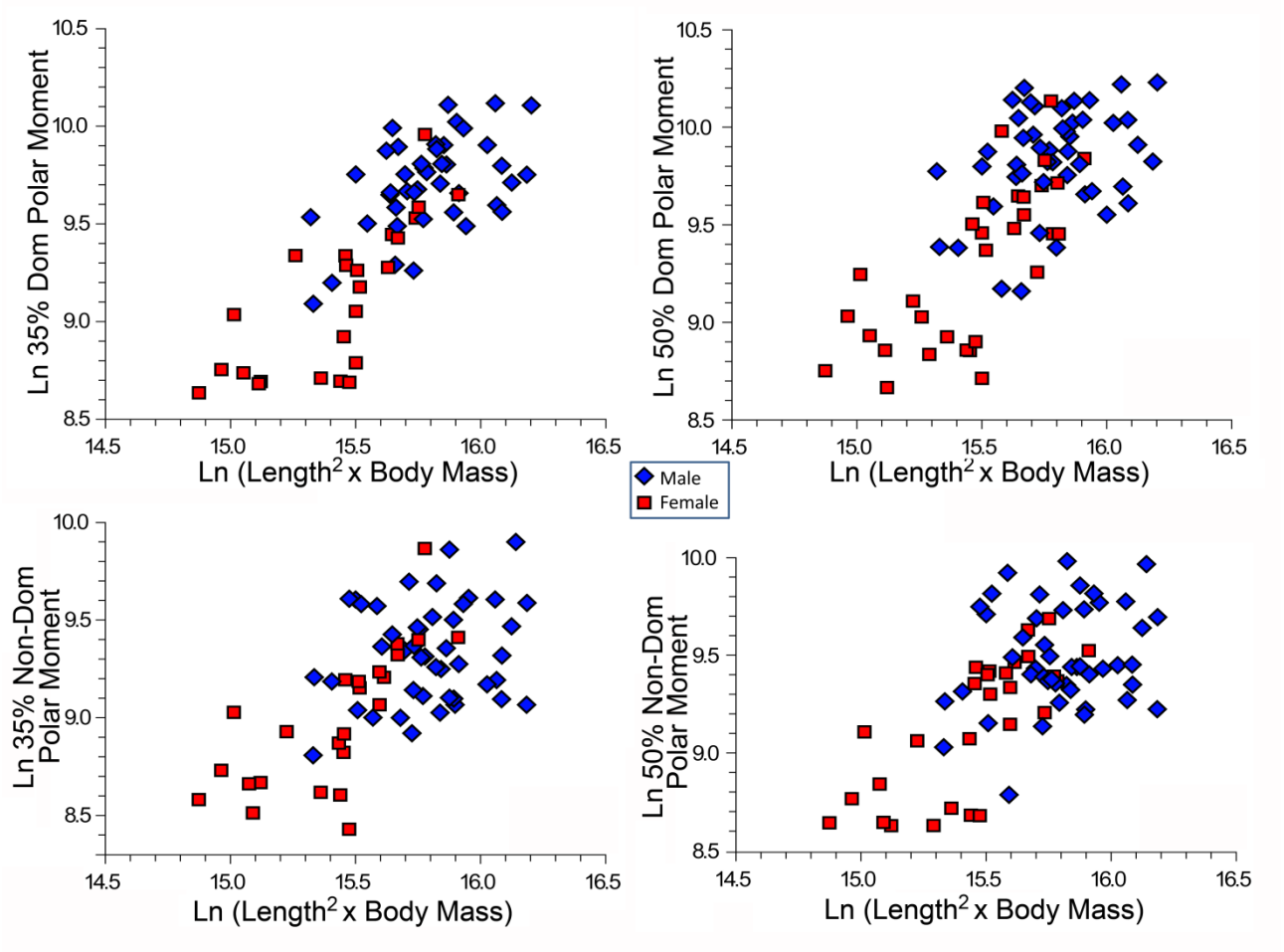

Figure S2. Bivariate plots of humeral polar moments of area versus body mass x length^2 by sex for Eurasian and North African Late Pleistocene humeri.

From these distributions of humeral rigidity versus bone length and body mass, it is evident that all of the Late Pleistocene humans follow the same general pattern and level of humeral diaphyseal hypertrophy. It is most evident in the dominant humeri, but it is present as well in the non-dominant ones. There is some difference across the regional and temporal samples in the average levels of robustness; in general the LUP humeri are more robust that those of the EUP and MPMP samples, with the smaller number of Neandertal humeri spanning the distributions (Fig. S1). However, when the regional/temporal samples are pooled and males and females are compared (Fig. S2), the humeri from the two sexes fall along the same proportional distribution. Moreover, for those specimens in the size overlap range, there is no differences between the sexes. Whatever differences in upper limb activities may have existed between the sexes across these samples, they are not reflected in differential hypertrophy of the proximal arm.

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