Supplementary Online Material (SOM):

New femoral remains of *Nacholapithecus kerioi*: Implications for intraspecific variation and Miocene hominoid evolution

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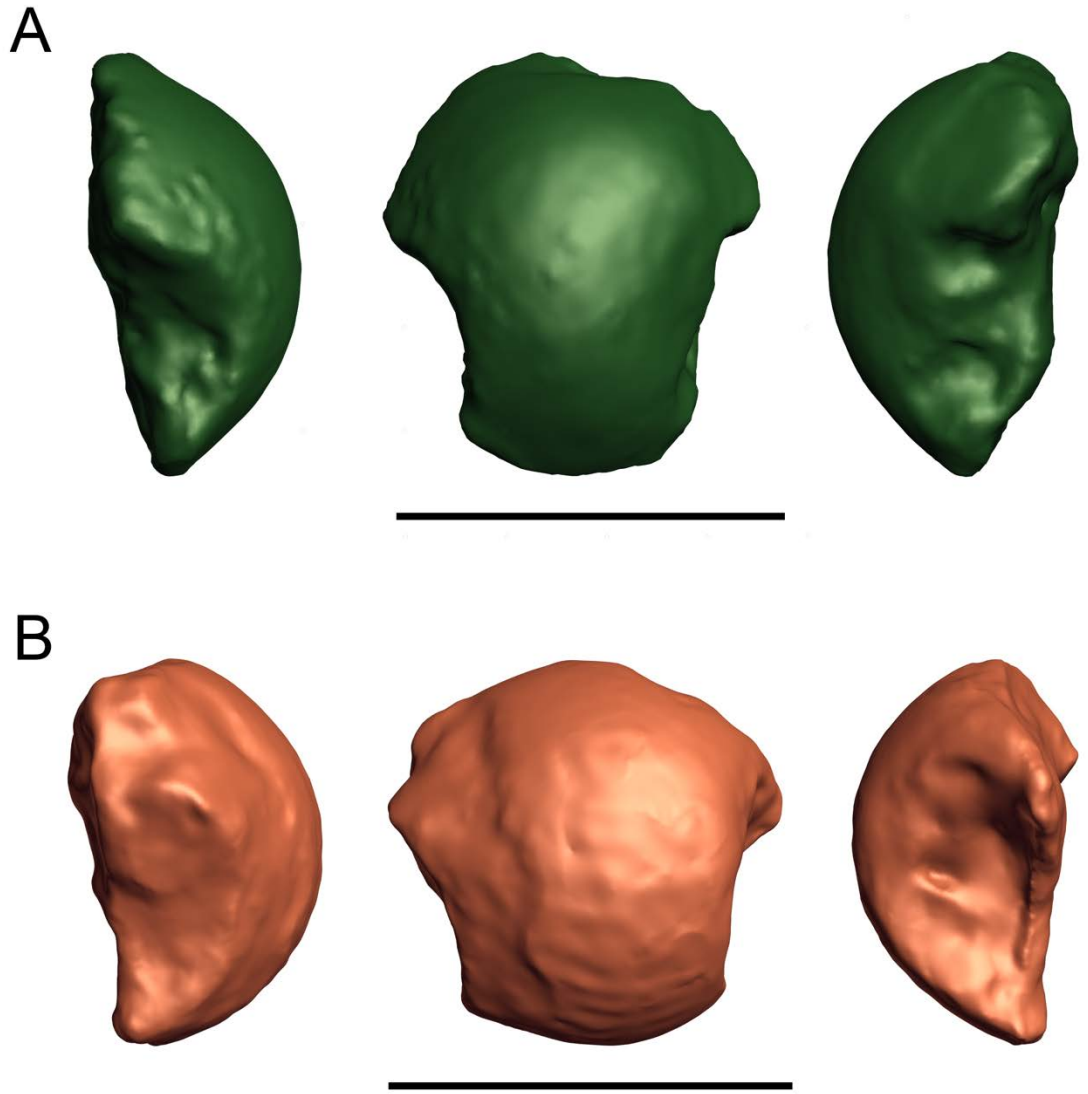
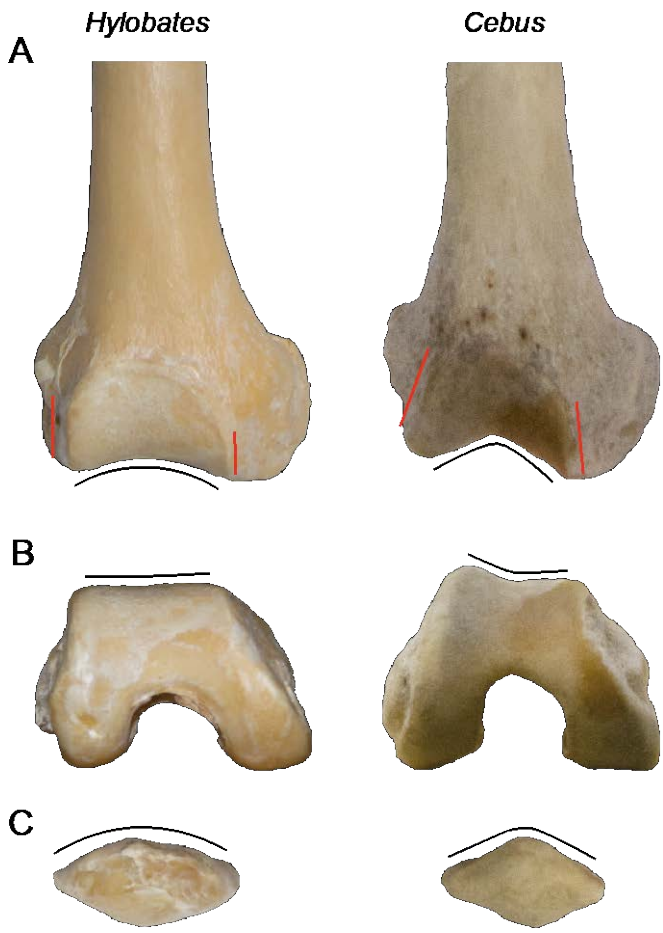
SOM Figure S1. Comparison of the femoral distal diaphysis fragment (posterior views) of *Nacholapithecus kerioi* (KNM-BG 42722; left) with *Equatorius africanus* (cast BNMH M 16332-3; right). KNM-BG 42722 is placed at the shaft location that might correspond with that of BNMH M 16332-3. Scale bar = 20 mm.



SOM Figure S2. Screenshots from 3D models of A) KNM-BG 15333, and B) KNM-BG 13336. Left and right, side views; center, medial view. These two fragments were described by previous authors (Rose et al., 1996), who suggested that both fragments would be femoral heads of the species *Nacholapithecus kerioi*. We amended these attributions in this work, suggesting that (A) is a humeral head of *N. kerioi*; whereas (B) would be a femoral fragment that belongs to a nonprimate mammal (see text for further explanation). Scale bar = 20 mm.



SOM Figure S3. Distal femoral end and patellae of *Hylobates* and *Cebus* in A) anterior, B) distal, and C) proximal views, respectively. Femora are displayed at the same mediolateral width, and patella at the same anteroposterior thickness to facilitate morphological comparisons. Black continuous lines denote the depth of the patellar groove in the femur and its respective morphology at the articular surface of the patella. As shown in the figure, anthropoid monkeys display a deeper patellar groove while it is shallow in apes. Red continuous lines represent the lateral and medial rims of the patellar groove in the femur, highlighting that the rims are parallel in apes and tend to converge in anthropoid monkeys. See also 3D models of femora belonging to *N. kerioi* (KNM-BG 42732), *Hylobates lar*, and *Cebus apella* (SOM 3D Models S1, S2, and S3).

SOM Table S1

Descriptive statistics for APN, SIH, SIN, NL, and TotW in the *Nacholapithecus kerioi* sample. All measurements are taken in mm.

	n	Mean	SD	Min	Max
APN	9	9.89	2.00	7.76	12.90
SIH	9	20.05	3.01	17.00	24.80
SIN	9	14.99	1.76	13.10	18.20
NL	5	20.36	3.97	17.30	25.80
TotW	5	43.68	7.72	37.70	54.20

Abbreviations: APN = anteroposterior neck depth; *n* = sample size; Max = maximum value; Min = minimum value; NL = neck length; SIH = superoinferior height of the femoral head; SIN = superoinferior height of the femoral neck; SD = standard deviation; TotW = total mediolateral width of the proximal femur.

SOM Table S2

Summary of the main femoral traits qualitatively described in this study and compared with previously published reports.

		Rose et al., 1996	Nakatsukasa et al., 1998	Ishida et al., 2004	Nakatsukasa et al., 2012	Kikuchi et al., 2018	This study[a]
Proximal	FH				Strong anteversion; weak anterior displacement of the FH center related to FN axis	Inclined weakly anteriorly; rounded	Absence of strong anteversion
	Articular surface FH		Moderately wide	Mediolaterally deep	Extensive and mushrooms over the neck	Moderately wide coverage, mushroomed around the neck	Hemispherical
	FH-GT projection			FH slightly above GT	FH slightly above GT	FH higher than GT	FH above GT
	FH/FN relation				Large	Large (FN constricted superoinferiorly relative to the FH)	Small relative FH
	Fovea capitis				Antero-posteriorly oblong, posteroinferiorly situated	Faint, positioned posteroinferiorly	Shallow; positioned in the distal half of the FH
	FN length			Relatively short	Apparently short	Relatively short	Moderately long
	NSangle		High	High	High		Moderately high
	Lateral flare GT	Protuberant	Flare of the m gluteus minimus insertion		Protuberant insertion of m gluteus minimus	Projects laterally (mainly the distal part)	Inconclusive

	LT	More lateral than posterior projection	Large	Posteromedially directed	Superoinferiorly wide and projects medially	High position, long, projecting medially and moderately posteriorly	Posteromedial direction, close to the FN
	Gluteal tuberosity	Discrete and protuberant		Prominent	Proximally placed (close to the insertion of the m gluteus minimus)		Marked, close to the GT
Distal	Patellar surface		Wide	Squared-shaped	Squared-shaped and wide		Squared-shaped and shallow
	Epicondyles			Similar mediolateral breath	Symmetrical		Symmetrical

Abbreviations: FH = femoral head; FN = femoral neck; GT = greater trochanter; LT = lesser trochanter; m = muscle; NSangle = neck-shaft angle.

[a]See also Pina et al. (2018).

SOM Table S3

Descriptive statistics for SIH/(√SIN*APN) (upper row), relative NL (middle row), and NSangle (bottom row) for each species in the sample of extant anthropoids.

Species	*n*	Mean	SD	Min	Max
Cebus apella	33	1.55	0.07	1.41	1.70
	27	49.70	3.98	40.70	59.04
	27	121.16	5.40	111.99	133.20
Ateles sp.	8	1.67	0.13	1.51	1.94
	8	48.60	5.50	39.88	56.73
	8	127.60	6.24	118.20	134.15
Aloutta sp.	45	1.70	0.11	1.48	1.97
	28	45.09	4.29	31.14	52.62
	30	123.62	6.02	111.03	134.48
Presbytis sp.	34	1.47	0.06	1.37	1.66
	25	42.48	4.00	34.29	53.36
	33	113.23	4.23	103.77	122.19
Colobus sp.	28	1.44	0.09	1.27	1.63
	32	41.59	5.15	30.45	49.49
	27	112.94	6.24	97.86	126.27
Nasalis larvatus	25	1.43	0.09	1.24	1.57
	25	38.14	4.06	29.24	47.52
	25	111.55	4.71	101.33	120.52
Chlorocebus sp.	16	1.45	0.08	1.32	1.60
	10	40.23	4.19	33.25	46.41
	—	—	—	—	—
Cercopithecus sp.	49	1.46	0.09	1.17	1.70
	37	42.27	5.69	32.00	55.61
	14	112.11	4.89	104.15	123.18
Macaca sp.	30	1.44	0.09	1.31	1.64
	27	38.67	5.07	26.36	46.76
	26	110.53	4.67	101.93	120.16
Lophocebus sp.	15	1.49	0.08	1.37	1.65
	7	39.31	4.07	33.71	45.92
	—	—	—	—	—
Mandrillus sp.	13	1.46	0.11	1.31	1.69å
	10	45.40	6.32	37.39	57.11
	10	109.32	6.26	97.84	117.42
Papio sp.	25	1.57	0.10	1.38	1.78
	18	42.91	4.71	35.77	53.70
	20	112.70	5.65	100.18	119.31
Hylobates lar	26	1.89	0.14	1.65	2.12
	25	35.08	3.65	28.33	42.19

	26	123.95	5.16	115.43	134.82
Pongo pygmaeus	12	1.93	0.14	1.70	2.14
	11	48.84	5.83	38.10	54.69
	12	134.93	5.81	127.29	145.07
Pan t. troglodytes	29	1.63	0.08	1.46	1.78
	17	44.47	5.67	36.73	52.97
	—	—	—	—	—
Pan t. schweinfurthii	25	1.68	0.10	1.53	1.94
	21	42.98	5.34	30.50	53.24
	26	123.00	5.11	114.27	132.69
Pan paniscus	20	1.66	0.10	1.53	1.84
	20	38.44	4.65	28.82	44.80
	20	122.77	5.31	114.23	130.86
Gorilla g. gorilla	31	1.65	0.09	1.48	1.81
	20	44.87	5.00	34.08	56.63
	26	121.95	3.98	113.31	127.82
Gorilla b. graueri	21	1.66	0.08	1.49	1.87
	22	42.49	3.75	34.31	50.51
	20	116.89	4.27	107.75	122.61
Gorilla b. beringei	10	1.60	0.07	1.47	1.77
	7	42.00	4.05	33.22	44.79
	9	120.96	4.92	113.94	129.04

Abbreviations: APN = anteroposterior neck depth; *n* = sample size; Max = maximum value; Min = minimum value; NL = neck length; NSangle = neck-shaft angle; SIH = superoinferior height of the femoral head; SIN = superoinferior height of the femoral neck; SD = standard deviation.

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