

Supplemental Material

Sexual dimorphism in human browridge volume measured from 3D models of dry crania: a new digital morphometrics approach

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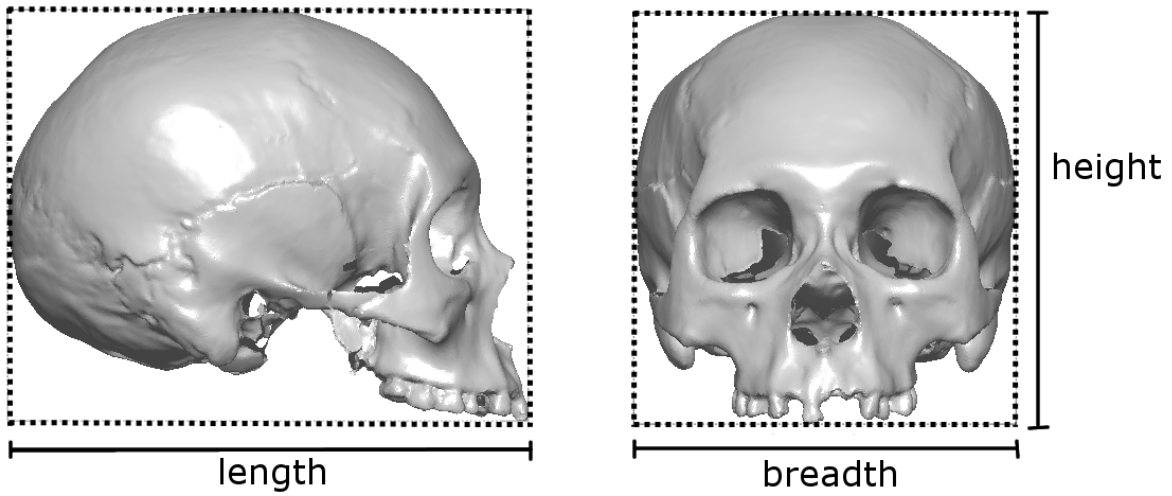
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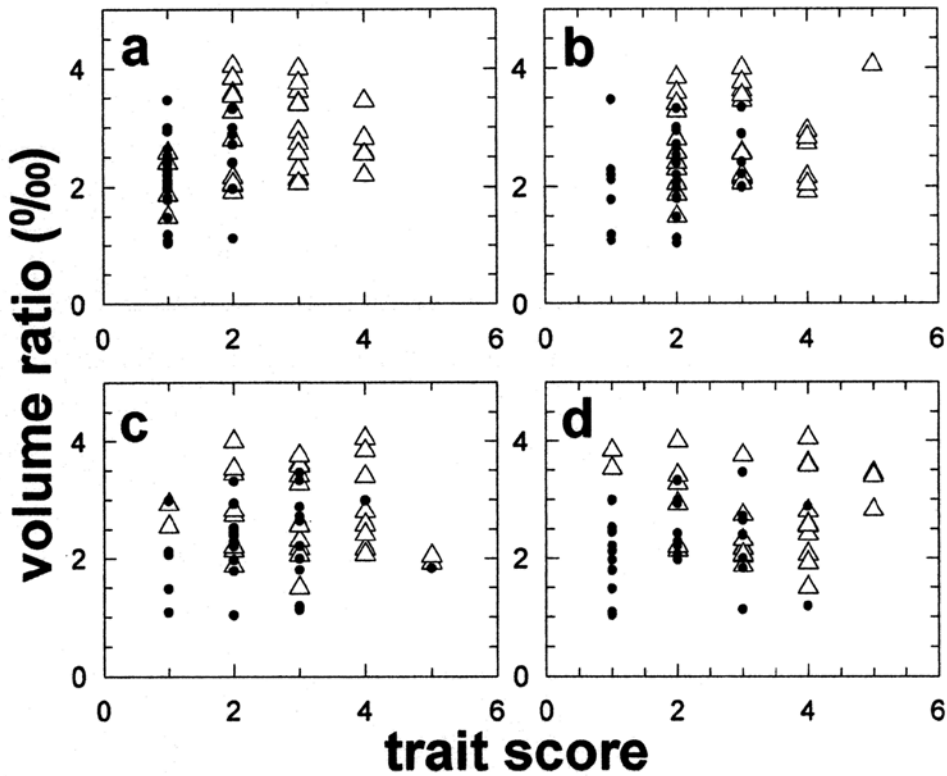
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References



Supplemental Material, Figure S1. For each cranium, bounding box volumes were calculated by multiplying the length, breadth, and height of each 3D model. These bounding box volumes are conveniently obtained in most 3D-modelling software.



Supplemental Material, Figure S2. Volume ratios plotted versus trait scores for both the early and late California Indian crania: a) Glabellar Prominence; b) Supraorbital Margin; c) Mastoid Process; d) Nuchal Crest. Black circles are female specimens, white triangles are male.

ID	Browridge Volume (mm ³)	Cranial Box Volume (mm ³)	Volume Ratio (%)	Sex
377	5365	4004333	1.34	M
509	9323	4984183	1.87	M
663	10669	4729349	2.26	M
675	10763	4536701	2.37	M
704	6010	4439095	1.35	M
881	8194	4353461	1.88	M
905	18716	4722564	3.96	M
969	14566	4475701	3.25	M
981	12597	4883392	2.58	M
990	6007	4588472	1.31	M
1206	7969	4288603	1.86	M
1399	10563	4313306	2.45	M
1573	11766	4858337	2.42	M
1606	18634	3962417	4.70	M
253R	5014	2359685	2.12	F
253RR	8992	4048439	2.22	F
610	14676	4779424	3.07	F
615	7258	4041351	1.80	F
723	7557	4534253	1.67	F
766	6776	4586889	1.48	F
815	7478	4182423	1.79	F
1015	11730	3827081	3.06	F
1064	7385	4223261	1.75	F
1306	9078	3529825	2.57	F
1332	12148	3976097	3.06	F
1333	10435	4986973	2.09	F
1351	16066	4422731	3.63	F
1500	4019	3880277	1.04	F
1289R	8365	3755400	2.23	F
1600	8349	4252853	1.96	F

Supplemental Material, Table S1. Volumetric data and sex for modern African-American crania from the Terry collection at the Smithsonian National Museum of Natural History (for a description of the collection, see Hunt and Albanese 2005 [1]).

ID	Browridge Volume (mm ³)	Cranial Box Volume (mm ³)	Volume Ratio (‰)	Sex
112	9297	4047745	2.30	M
154	18714	5459606	3.43	M
163	12400	4109167	3.02	M
176	11346	4380309	2.59	M
242	9258	4804749	1.93	M
243	13646	4710662	2.90	M
245	9075	3652793	2.48	M
298	12781	4545165	2.81	M
301	7977	4801171	1.66	M
305	11323	4904733	2.31	M
54	11314	3795702	2.98	M
60	13972	4885805	2.86	M
73	13180	5402546	2.44	M
75	14815	4679943	3.17	M
1569	15520	5345511	2.90	M
1614	12231	3998652	3.06	M
1620	14938	4312683	3.46	M
1622	17285	4343332	3.98	M
1633	12310	4594838	2.68	M
104	5466	5094835	1.07	F
115	9437	3571667	2.64	F
181	6526	3986312	1.64	F
203	7170	3719783	1.93	F
223	5210	3493628	1.49	F
30	10719	4042037	2.65	F
39	6166	3877476	1.59	F
42	5442	3898238	1.40	F
63	8580	4216025	2.04	F
89	7281	4221591	1.72	F
8	10650	3802430	2.80	F
74	10862	3901102	2.78	F
1618	8376	3894343	2.15	F
1623	9010	3945941	2.28	F
1627	12322	4156487	2.96	F
1632	11971	3984946	3.00	F
1635	12846	3627974	3.54	F

Supplemental Material, Table S2. Volumetric data and sex for modern Portuguese crania from the Luis Lopes collection in Lisbon (for a description of the collection, see Cardoso 2006 [2]).

ID	Browridge Volume (mm ³)	Cranial Box Volume (mm ³)	Volume Ratio (%)	Glabellar Prominence	Supra-orbital Margin	Nuchal Crest	Mastoid Process	Sex
12.5	12185	4730515	2.58	1	2	4	4	M
12.6	11014	4572214	2.41	1	2	4	4	M
12.11	13134	4687929	2.80	2	2	4	4	M
12.16	6517	4358422	1.50	1	2	4	3	M
12.24	9174	4784589	1.92	2	4	4	5	M
12.28	9721	4734489	2.05	2	2	3	3	M
12.33	15996	4528027	3.53	2	3	1	2	M
12.34	14650	4312316	3.40	3	2	5	4	M
12.35	15913	4236998	3.76	3	3	3	3	M
3804	10979	4304862	2.55	4	3	4	1	M
3805	18786	5241956	3.58	2	2	4	3	M
4008.1	10066	4949020	2.03	2	4	3	5	M
4035	15197	3956263	3.84	2	2	1	4	M
4037.1	9455	5061300	1.87	1	2	3	2	M
12.1	9975	3958021	2.52	1	2	1	2	F
12.3	9553	4175993	2.29	1	1	2	2	F
12.4	9378	3831660	2.45	1	2	1	2	F
12.7	7258	4074251	1.78	1	1	1	2	F
12.8	5711	3860346	1.48	1	2	1	1	F
12.12	9826	4443674	2.21	1	3	2	2	F
12.13	8326	4566818	1.82	1	2	3	5	F
12.14	12918	4319146	2.99	1	2	1	4	F
12.15	10663	3567540	2.99	2	2	2	1	F
12.21	4448	4310096	1.03	1	2	1	2	F
12.31	7807	3785448	2.06	1	2	2	1	F
3801.1	10301	4253801	2.42	1	2	2	2	F
3808.1	4463	4117043	1.08	1	1	1	1	F
3817	8323	3938263	2.11	1	1	1	1	F
3819.1	11131	4343788	2.56	3	2	4	3	F
4010	5648	4774243	1.18	1	1	4	3	F
4024.1	9564	4863423	1.97	1	2	1	2	F
4038	7515	3817946	1.97	2	2	2	2	F
4040.1	8618	3911593	2.20	1	1	1	3	F

Supplemental Material, Table S3. Volumetric data, trait scores, and sex for archaeologically excavated early California Indian crania.

ID	Browridge Volume (mm ³)	Cranial Box Volume (mm ³)	Volume Ratio (‰)	Glabellar Prominence	Supra-orbital Margin	Nuchal Crest	Mastoid Process	Sex
12.2	14436	4228723	3.41	3	2	2	3	M
12.8	9040	4178684	2.16	2	3	3	3	M
12.9	8735	4093532	2.13	3	3	2	2	M
12.10	9891	4581653	2.16	2	4	3	4	M
12.20	11842	4194400	2.82	4	4	5	2	M
12.27	9130	4156722	2.20	4	3	2	2	M
12.28	14853	3714094	4.00	3	3	2	2	M
12.30	11139	3400807	3.28	2	2	2	3	M
12.34	14852	4306785	3.45	4	3	5	2	M
12.38	11650	3969447	2.93	3	4	2	1	M
12.42	13582	3756016	3.62	3	3	4	3	M
12.45	9120	4427193	2.06	3	3	4	4	M
12.47	10033	4351772	2.31	3	2	3	3	M
12.55	16998	4197487	4.05	2	5	4	4	M
12.57	12286	4777202	2.57	4	3	4	3	M
12.65	10994	4017754	2.74	3	4	3	2	M
12.31	10787	3670981	2.94	1	2	2	2	F
12.32	13657	4120059	3.31	2	2	2	2	F
12.35	7970	3621602	2.20	1	2	2	2	F
12.36	9633	4028701	2.39	1	2	3	2	F
12.41	11045	3830239	2.88	2	3	4	3	F
12.48	12794	3839112	3.33	2	3	2	3	F
12.49	10191	3753190	2.72	2	2	3	3	F
12.50	10890	4526729	2.41	2	3	3	2	F
12.51	6952	3867747	1.8	1	2	1	3	F
12.61	4701	4177765	1.13	2	2	3	3	F
12.62	14925	4309682	3.46	1	1	3	3	F
12.68	9766	3694829	2.64	1	2	3	3	F
12.76	8170	4106152	1.99	1	3	3	3	F

Supplemental Material, Table S4. Volumetric data, trait scores, and sex for archaeologically excavated late California Indian crania.

	Spearman's correlation	Kendall's correlation	Pearson's correlation
Volume ratio vs. Nuchal Crest scores	0.21	0.14	0.18
Volume ratio vs. Mastoid scores	0.16	0.09	0.12
Volume ratio vs. Supraorbital Margin scores	0.32	0.21	0.30
Volume ratio vs. Glabellar scores	0.48	0.34	0.41

Supplemental Material, Table S5. Correlation coefficients describing the relationship between volume ratio and trait scores for the nuchal crest, mastoid process, supraorbital margin, and glabellar prominence, respectively. Since the trait scores are limited to integer values, a completely linear relationship between volume ratios and trait scores cannot be expected. Hence, in addition to Pearson's r-values, rank correlation coefficients were calculated according to both Spearman's and Kendall's methods (see Hill and Lewicki 2006 [3]).

References

- [1] D. R. Hunt, J. Albanese, History and demographic composition of the Robert J. Terry anatomical collection, *Am. J. Phys. Anthropol.* 127 (2005) 406-417.
- [2] H. F. V. Cardoso, Brief communication: The collection of identified human skeletons housed at the Bocage Museum (National Museum of Natural History), Lisbon, Portugal, *Am. J. Phys. Anthropol.* 129 (2006) 173-176.
- [3] T. Hill, P. Lewicki, *Statistics: Methods and Applications*, StatSoft, Tulsa, 2006.