

# Isotopic Evidence for Landscape Use and the Role of Causewayed Enclosures During the Earlier Neolithic in Southern Britain

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## APPENDIX S1: RESULTS OF ANALYSIS

TABLE S1. (OVER PAGE). RESULTS OF STRONTIUM, OXYGEN & CARBON ISOTOPE ANALYSIS OF TOOTH ENAMEL

Age categories, sexing information, & relative completeness of skeletons after Mckinley (2008). M = Male; F = Female; U = Unsexed; '?' = PROBABLE and '??' = POSSIBLE, the latter notations are as used by McKinley (2008, 490-1) to denote different levels of certainty in the attribution of sex. Approximate age of death is as determined by tooth eruption & stage of root development following AlQahtani *et al.* (2010). All sampled teeth derive from mandibles. L = Left; R = right; DM1 = first deciduous molar tooth; DM2 = second deciduous molar tooth; M1 = first permanent molar tooth; M2 = second permanent molar; M3 = third permanent molar; PM1 = first premolar tooth; PM2 = second premolar tooth. The location & context of skeletal remains is as documented by Mercer & Healy (2008, 41-377). Radiocarbon dates after Healy *et al.* (2011, 118-31) are calibrated date ranges at 95% confidence (cal. BC; OxCal v.3.10).

<i>Museum accession number</i>	<i>Box</i>	<i>Location</i>	<i>Context</i>	<i>Phase</i>	<i>Calibrated date range (cal. BC, 95% confidence)</i>	<i>Sex</i>	<i>Age category / estimated age at death</i>	<i>Completeness of skeleton</i>	<i>Tooth</i>	<i>Sr ppm (mg/kg)</i>	<i>1/Sr ppm x 1000</i>	$^{87}\text{Sr}/^{86}\text{Sr}$	$\delta^{13}\text{C}_{\text{carbonate}} \text{‰ VPDB}$	$\delta^{18}\text{O}_{\text{carbonate}} \text{‰ VPDB}$	$\delta^{18}\text{O}_{\text{carbonate}} \text{‰ VSMOW}$	$\delta^{18}\text{O}_{\text{phosphate}} \text{‰ VSMOW}$
ST79 2025/ST79 2386	437	Pit, Stepleton spur	2A/F200		3710-3530	?? M	Older adult	40%	LPM1	20	50	0.70866	-16.2	-3.1	27.7	18.9
									LM3	12	83.33333	0.70879	-16.2	-3.9	26.9	18.1
HH76 1948	414	Main enclosure	18	i/ii	3650-3520	U	Juvenile (7 years)	85%	LM1	61	16.39344	0.70794	-16.4	-3	27.8	19
ST78 2755a	433	Inner Stepleton outwork	7	iii	3640-3380	U	Young child (1.5 - 2 years)	Disarticulated	LDM1	12	83.33333	0.70836	-15.3	-3.4	27.5	18.7
ST79 2726	430	Inner Stepleton outwork	7	i	3640-3370	M	Older mature adult	95%	LM1	42	23.80952	0.71016	-14.3	-4	26.8	18
									LM2	16	62.5	0.70877	-16.5	-3.6	27.2	18.4
									LM3	28	35.71429	0.70969	-16.4	-3.2	27.6	18.8
ST78 964/ST78 710	424	Pit, Stepleton spur	1A/F70		3640-3360	U	Older child / young juvenile (5 years)	80%	LDM2	32	31.25	0.70876	-16.1	-2.4	28.5	19.7
ST81 3181	427	Pit, Stepleton spur	4B/F712		3630-3370	M	Young adult	98%	LM1	38	26.31579	0.71043	-16.8	-3.5	27.3	18.5
									LM2	36	27.77778	0.71012	-16.2	-3.6	27.2	18.4
									LM3	63	15.87302	0.71022	-15.8	-3.7	27.1	18.3
ST80 1875	435	Outer Stepleton outwork	3	i	3630-3360	M	Young adult	98%	LM1	108	9.259259	0.71094	-16.5	-2.7	28.1	19.3
									LM2	51	19.60784	0.71079	-15.8	-3.2	27.6	18.8
									LM3	88	11.36364	0.70977	-16.3	-3.2	27.6	18.8
ST78 2755	433	Inner Stepleton outwork	7	iii	3500-3130	M	Older sub-adult / young adult	98%	LM1	17	58.8235294	0.70835	-16.1	-3.2	27.6	18.8
									LM2	13	76.9230769	0.70779	-15.3	-3.8	27	18.2
									LM3	21	47.6190476	0.70839	-15.7	-3.7	27.1	18.3
HH76 3046	413	Main enclosure	17	vii	3500-3090	U	Young juvenile (5 - 8 years)	70%	LDM2	63	15.8730159	0.70903	-16.4	-2.8	28.1	19.3
HH76 3034/HH76 3030	413	Main enclosure	6.2	i	Undated	U	Older Juvenile (10 - 15 years)	Disarticulated	LM1	55	18.1818182	0.70827	-16.4	-3.8	27	18.2
									LM2	63	15.8730159	0.70833	-15.9	-3.6	27.2	18.4

<i>Museum accession number</i>	<i>Box</i>	<i>Location</i>	<i>Context</i>	<i>Phase</i>	<i>Calibrated date range (cal. BC, 95% confidence)</i>	<i>Sex</i>	<i>Age category / estimated age at death</i>	<i>Completeness of skeleton</i>	<i>Tooth</i>	<i>Sr ppm (mg/kg)</i>	<i>1/Sr ppm x 1000</i>	<i><sup>87</sup>Sr/<sup>86</sup>Sr</i>	<i>δ<sup>13</sup>C<sub>carbonate</sub> ‰ VPDB</i>	<i>δ<sup>18</sup>O<sub>carbonate</sub> ‰ VPDB</i>	<i>δ<sup>18</sup>O<sub>carbonate</sub> ‰ VSMOW</i>	<i>δ<sup>18</sup>O<sub>phosphate</sub> ‰ VSMOW</i>
HH75 2183/HH75 2136	416	Main enclosure	8	ii	Undated	U	Sub-adult / adult (c. 15 years)	Disarticulated	LM1	30	33.3333333	0.7093	-16.3	-3.3	27.6	18.8
									LM2	14	71.4285714	0.70929	-15	-3.8	27	18.2
HH75 1848	417	Main enclosure	11	ii	Undated	??M	Older mature adult	Disarticulated	LM2	78	12.8205128	0.70900	-16.6	-3.2	27.6	18.8
									LM3	34	29.4117647	0.70813	-15.9	-3.6	27.2	18.4
HH74 HB 2	417	Main enclosure	4	iii	Undated	U	Sub-adult (> 11 years)	Disarticulated	LM1	46	21.7391304	0.70876	-15.7	-2.3	28.5	19.7
									LM2	21	47.6190476	0.70898	-16	-3.8	27	18.1
HH74 HB 5	418	Main enclosure	4	iii	Undated	??F	Sub-adult (> 11 years)	Disarticulated	LM1	67	14.9253731	0.70904	-15.5	-2.1	28.7	20
									LM2	88	11.3636364	0.70927	-16	-2.6	28.3	19.5
HH76 2741/2792	418	Main enclosure	17	iv	Undated	U	Sub-adult (8 - 10 years)	Disarticulated	LM1	25	40	0.70962	-16.6	-2.8	28	19.2
									RM2	98	10.2040816	0.70952	-15.6	-3.9	26.9	18
HH75 2023/HH75 2138	418	Main enclosure	8	iii	Undated	U	Child (3 years)	Disarticulated	LDM2	34	29.4117647	0.70966	-15.4	-2.8	28	19.2
HH77 80	422	Long barrow	1	viii	Undated	U	Young / younger mature adult	Disarticulated	LM2	57	17.5438596	0.70869	-16.5	-3.3	27.5	18.7
									LM3	18	55.5555556	0.70848	-15.9	-3.6	27.2	18.4
HH75 1340	421	Inner East Cross Dyke	5	v	Undated	??M	Young adult	Disarticulated	LM1	35	28.5714286	0.71029	-16.1	-2.8	28.1	19.3
									LM2	58	17.2413793	0.70987	-15.5	-3.3	27.5	18.7
									LM3	70	14.2857143	0.70938	-15.3	-3.7	27.1	18.3
ST79 1428	429	Inner Stepleton outwork	5	i	Undated	??M	Older adult	Disarticulated	LPM1	12	83.3333333	0.70878	-15.8	-2.9	28	19.2
									LPM2	19	52.6315789	0.7093	-14.6	-3	27.9	19.1
ST78 1100/ST78 2047	431	Inner Stepleton outwork	9	iii	Undated	F	Young / younger mature adult	Disarticulated	LM1	19	52.6315789	0.71068	-16.3	-3.5	27.3	18.5
									RM2	22	45.4545455	0.71075	-15.4	-3.6	27.2	18.4
									RM3	29	34.4827586	0.70981	-15.2	-3.3	27.5	18.7
ST78 2248	431	Inner Stepleton outwork	9	iii	Undated	U	Child (3 years)	Disarticulated	LDM2	27	37.037037	0.7081	-15.6	-2.6	28.2	19.4
HN82 365 LDM2	438	Inner Hanford outwork	2	iii	Undated	U	Child (3 years)	Disarticulated	LDM2	16	62.5	0.70826	-15.5	-2.2	28.7	19.9

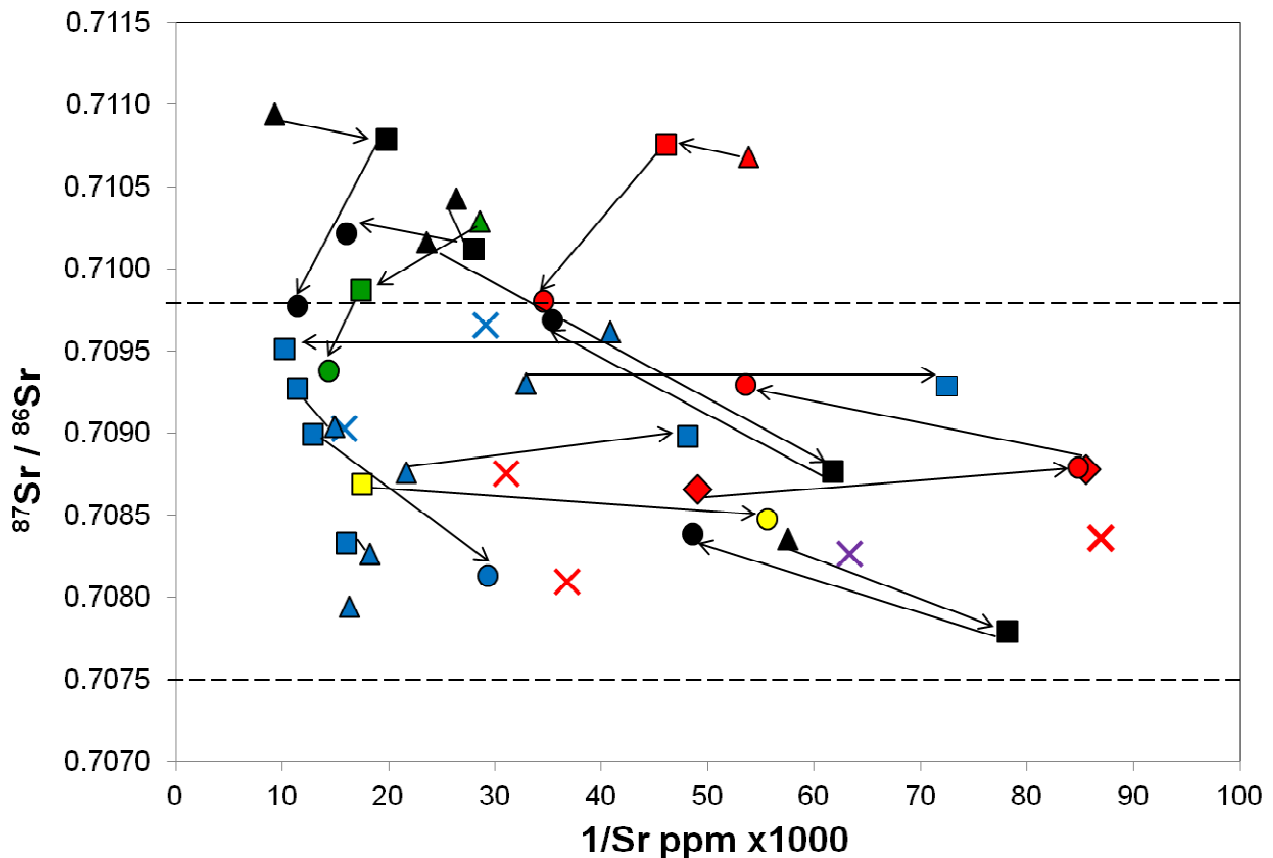


Fig. S1.

Plot of strontium isotope ratio and elemental concentration with arrows illustrating adjacent linked molar teeth belonging to the same individual

Symbols coloured according to the context from which the individual is recorded to have been excavated. Dashed line illustrates the predicted biosphere range at Hambleton Hill, in an area of Chalk where superficial deposits of clay-with-flints are known to be present (based on current measured values by Warham 2011, 120, 124). Triangles: first permanent molars. Squares: second permanent molars. Circles: third permanent molars. Diamonds: Crosses: premolars or incisors. Crosses: deciduous teeth. Black triangles, squares & circles: adult males buried on Stepleton spur who are inferred to have died during episodes of conflict at the site. Red symbols: individuals excavated from Stepleton spur enclosure. Red crosses: deciduous teeth of children excavated from Stepleton spur enclosure. Purple symbol: deciduous tooth of child excavated from the Hanford outworks. Yellow symbols: individual excavated from the south long barrow. Green symbols: individual excavated from the inner east cross dyke. Blue triangles, squares and circles: individuals excavated from the main enclosure. Blue crosses: deciduous teeth of children excavated from the main causewayed enclosure.  $2\sigma$  errors for  $^{87}\text{Sr}/^{86}\text{Sr}$  are within the symbol.

#### BIBLIOGRAPHY

AlQahtani, S.J., Hector, M.P. & Liversidge, H.M. 2010. Brief communication: The London atlas of human tooth development and eruption. *American Journal of Physical Anthropology* 142, 481–90

- Healy, F., Bayliss, A., Whittle, A., Allen, M.J., Mercer, R., Rawlings, M., Sharples, N. & Thomas, N. 2011. South Wessex. In Whittle Bayliss, A. & Healy, F (eds), *Gathering Time: Dating the Early Neolithic enclosures of Southern Britain and Ireland*. Oxford: Oxbow Books, 111–206
- McKinley, J. 2008. Human remains. In Mercer & Healy (eds) 2008, 477–522
- Mercer, R. & Healy, F. (eds). 2008. *Hambledon Hill, Dorset, England: Excavation and survey of a Neolithic monument complex and its surrounding landscape*. Swindon: English Heritage
- Warham, J.O. 2011. *Mapping biosphere strontium isotope ratios across major lithological boundaries. A systematic investigation of the major influences on geographic variation in the  $^{87}\text{Sr}/^{86}\text{Sr}$  composition of bioavailable strontium above the Cretaceous and Jurassic rocks of England*. Unpublished PhD Thesis, University of Bradford