

APPENDIX I

Data tables

- A1 Results table for archaeological human tooth samples
- A2 Results table for archaeological animal tooth samples
- A3 Results table for modern human tooth samples
- A4 Results table for soil and rock leaches

Table A1 Results table for archaeological human tooth samples

Sample No.	Skeleton code	Sample* material	Sr ppm	⁸⁷ Sr/ ⁸⁶ Sr normalised	Pb ppm	²⁰⁶ Pb/ ²⁰⁴ Pb	²⁰⁷ Pb/ ²⁰⁴ Pb	²⁰⁸ Pb/ ²⁰⁴ Pb	²⁰⁸ Pb/ ²⁰⁶ Pb	²⁰⁷ Pb/ ²⁰⁶ Pb
1. Blackfriars, Gloucester										
1	77	E	65.9	0.711971	6.86	18.44	15.62	38.38	2.082	0.847
		SE	58.0	0.712043	9.05	18.43	15.61	38.36	2.081	0.847
		D	185	0.710232	18.2	18.44	15.63	38.40	2.083	0.848
2	89	E	70.1	0.708877	0.09	18.27	15.50	37.92	2.076	0.849
		SE	65.2	0.708821	0.20	18.27	15.50	37.94	2.077	0.848
		D	244	0.709709	0.63	-	-	-	-	-
3	209	E	62.0	0.710959	-	18.39	15.62	38.37	2.086	0.850
		D	208	0.709885	-	18.41	15.62	38.36	2.083	0.848
4	341	E	56.1	0.714288	8.75	18.44	15.61	38.36	2.081	0.846
		SE	49.7	0.714121	12.6	18.45	15.62	38.40	2.081	0.846
		D	273	0.710187	67.3	18.50	15.66	38.50	2.081	0.846
5	341	E	58.5	0.714232	10.0	18.45	15.62	38.38	2.081	0.846
		SE	43.9	0.714427	8.05	18.45	15.62	38.39	2.081	0.846
		D	243	0.710259	74.1	18.46	15.63	38.44	2.082	0.847
6	357	E	56.4	0.711355	-	18.42	15.62	38.39	2.084	0.848
		D	387	0.709974	-	18.41	15.62	38.38	2.084	0.848
2. Cnip, Isle of Lewis										
7	A	E	101	0.710488	1.18	18.39	15.58	38.31	2.083	0.847
		D	222	0.709999	-	-	-	-	-	-
8	B	E	152	0.709595	44.4	18.52	15.60	38.45	2.075	0.842
		D	522	0.709731	-	-	-	-	-	-
9	C	E	210	0.709526	-	18.45	15.61	38.40	2.081	0.846
		D	865	0.710059	-	-	-	-	-	-
10	D	E	169	0.707802	0.48	18.43	15.59	38.33	2.079	0.845
		D	195	0.708411	-	-	-	-	-	-

Sample No.	Skeleton code	Sample* material	Sr ppm	$^{87}\text{Sr}/^{86}\text{Sr}$ normalised	Pb ppm	$^{206}\text{Pb}/^{204}\text{Pb}$	$^{207}\text{Pb}/^{204}\text{Pb}$	$^{208}\text{Pb}/^{204}\text{Pb}$	$^{208}\text{Pb}/^{206}\text{Pb}$	$^{207}\text{Pb}/^{206}\text{Pb}$
11	D	E	218	0.707932	0.50	18.40	15.59	38.26	2.080	0.847
12	E	E	58.2	0.708575	-	18.60	15.65	38.41	2.065	0.841
13	F	e	165	0.709771	0.66	18.36	15.56	38.35	2.089	0.847
		d	572	0.709946	-	-	-	-	-	-
14	G	e	417	0.710190	-	18.48	15.60	38.42	2.079	0.845
15	BA	E	158	0.709460	0.06	17.93	15.49	38.32	2.138	0.864
		D	316	0.710403	-	-	-	-	-	-
3. West Heselton, North Yorkshire										
16	G73	E	62.1	0.709101	0.19	18.53	15.61	38.43	2.075	0.843
17	G74	E	76.4	0.710061	0.37	18.44	15.59	38.32	2.078	0.846
18	G75	E	49.6	0.709865	8.16	18.45	15.60	38.32	2.077	0.846
19	G78	E	49.1	0.709502	1.66	18.46	15.62	38.37	2.078	0.846
20	G84	E	102	0.709485	0.20	18.47	15.63	38.39	2.079	0.847
21	G89	E	53.7	0.709792	0.21	18.38	15.59	38.25	2.081	0.848
22	G97	E	68.0	0.709895	0.19	18.41	15.58	38.30	2.080	0.846
23	G97	e	47.6	0.709606	0.13	18.38	15.61	38.30	2.084	0.850
24	G98	E	79.4	0.708498	0.19	18.24	15.60	38.12	2.090	0.855
25	G100	E	49.6	0.709002	0.41	18.44	15.60	38.34	2.079	0.846
26	G101	E	56.2	0.708757	0.21	18.47	15.63	38.40	2.079	0.846
27	G102	E	73.8	0.710339	0.48	18.48	15.64	38.44	2.080	0.846
28	G109	E	42.3	0.709532	0.26	18.49	15.61	38.40	2.078	0.844
29	G113	E	99.6	0.708228	0.23	18.43	15.59	38.29	2.078	0.846
30	G114	E	69.6	0.709364	0.26	18.51	15.62	38.41	2.076	0.844
31	G115	E	64.8	0.708664	0.99	18.43	15.60	38.33	2.079	0.846
32	G117	E	34.1	0.708480	0.37	18.48	15.61	38.40	2.078	0.845
33	G122	E	65.7	0.709767	0.87	18.42	15.59	38.28	2.078	0.846
34	G132	E	72.4	0.709132	0.26	18.44	15.59	38.30	2.077	0.845
35	G133	E	50.5	0.710228	2.96	18.43	15.59	38.28	2.077	0.846
36	G139	E	77.4	0.709189	0.15	18.50	15.63	38.40	2.076	0.845

Sample No.	Skeleton code	Sample* material	Sr ppm	⁸⁷ Sr/ ⁸⁶ Sr normalised	Pb ppm	²⁰⁶ Pb/ ²⁰⁴ Pb	²⁰⁷ Pb/ ²⁰⁴ Pb	²⁰⁸ Pb/ ²⁰⁴ Pb	²⁰⁸ Pb/ ²⁰⁶ Pb	²⁰⁷ Pb/ ²⁰⁶ Pb
37	G144	E	84.2	0.709064	0.28	18.50	15.61	38.41	2.076	0.844
38	G145	E	101	0.709549	0.14	18.47	15.59	38.33	2.076	0.844
39	G149	E	58.2	0.710570	0.55	18.47	15.60	38.34	2.076	0.845
40	G151	E	79.4	0.708610	0.28	18.58	15.61	38.49	2.071	0.840
41	G154	E	79.0	0.708857	0.26	18.45	15.61	38.36	2.080	0.846
42	G158	E	67.0	0.709937	0.49	18.43	15.62	38.40	2.084	0.848
43	G159	E	72.3	0.708990	0.15	18.51	15.62	38.41	2.076	0.844
44	G162	E	118	0.709014	0.94	18.44	15.61	38.36	2.080	0.846
45	G164	E	47.0	0.710808	0.41	18.52	15.64	38.51	2.079	0.844
46	G166	E	172	0.708796	0.35	18.42	15.59	38.32	2.081	0.847
47	G169	E	69.9	0.709032	0.19	18.49	15.64	38.46	2.080	0.846
48	G173	E	111	0.710482	0.21	18.42	15.61	38.32	2.080	0.847
49	WHIA-1	E	19.8	0.708465	0.05	18.74	15.71	38.70	2.065	0.838
50	WHIA-2	E	49.8	0.711006	0.11	18.51	15.57	38.31	2.070	0.841
51	IR266	E	33.8	0.708849	0.08	18.40	15.58	38.30	2.082	0.847
52	IR271	E	47.4	0.709057	0.04	18.34	15.60	38.26	2.086	0.850
53	IR304	E	36.6	0.709010	0.06	18.62	15.69	38.62	2.074	0.842
54	2BA229	E	256	0.711080	0.06	18.43	15.58	38.25	2.075	0.845
55	2BA283	E	63.9	0.709572	0.05	18.38	15.60	38.26	2.081	0.849
56	2BA589	E	56.0	0.708973	0.05	-	-	-	-	-
4. Mangotsfield, Bristol										
57	SK1a	E	-	0.710181	4.59	18.41	15.63	38.38	2.084	0.849
		D	-	0.709818	10.7	18.44	15.64	38.44	2.085	0.848
58	SK1b	E	-	0.710165	2.93	18.41	15.63	38.39	2.085	0.849
		SE	190	0.709890	8.68	18.43	15.63	38.41	2.085	0.848
		D	-	0.709885	7.71	18.43	15.63	38.39	2.084	0.848
59	SK2a	E	-	0.709901	0.59	18.42	15.62	38.37	2.084	0.848
		SE	36.8	0.709949	0.55	-	-	-	-	-
		D	118	0.710079	2.22	18.41	15.62	38.36	2.084	0.848

Sample No.	Skeleton code	Sample* material	Sr ppm	$^{87}\text{Sr}/^{86}\text{Sr}$ normalised	Pb ppm	$^{206}\text{Pb}/^{204}\text{Pb}$	$^{207}\text{Pb}/^{204}\text{Pb}$	$^{208}\text{Pb}/^{204}\text{Pb}$	$^{208}\text{Pb}/^{206}\text{Pb}$	$^{207}\text{Pb}/^{206}\text{Pb}$
60	SK2b	E	-	0.709795	1.08	18.44	15.65	38.44	2.085	0.848
		SE	-	0.709783	2.14	18.45	15.65	38.45	2.085	0.848
		D	-	0.709951	4.95	18.42	15.64	38.41	2.085	0.849
5. Spitalfields, London										
61	SPR-1	E	106	0.709897	30.1	18.46	15.70	38.62	2.092	0.851
6. Eagle Hotel, Winchester										
62	G318	E	56.3	0.708277	2.07	18.41	15.61	38.36	2.083	0.848
		D	59.0	0.708335	-	18.42	15.62	38.36	2.082	0.848
63	G319	E	91.2	0.708482	1.81	18.42	15.61	38.38	2.084	0.848
		D	-	0.708228	24.4	18.42	15.62	38.36	2.082	0.848
64	G326	E	80.0	0.708629	8.56	18.44	15.63	38.42	2.083	0.847
		D	-	0.708377	45.1	18.41	15.61	38.35	2.083	0.848
65	G339	E	93.4	0.709147	41.8	18.37	15.57	38.22	2.081	0.848
		D	111	0.708615	22.0	18.43	15.62	38.40	2.084	0.848
66	G339	E	79.2	0.709310	1540	18.43	15.62	38.36	2.081	0.847
		D	127	0.708626	44.3	18.42	15.61	38.40	2.084	0.848
7. Galson, Isle of Lewis										
67	Gals-93	E	71.4	0.713033	1.25	18.45	15.62	38.42	2.083	0.846
		D	269	0.710275	-	-	-	-	-	-
68	Gals-96	E	337	0.709345	0.61	18.50	15.74	39.35	2.131	0.853
		D	309	0.709365	-	-	-	-	-	-
69	Gals-II	E	233	0.709417	0.23	18.16	15.59	38.35	2.112	0.858
		D	242	0.709444	-	-	-	-	-	-
70	Gals-IV	E	82.1	0.711860	1.70	18.42	15.63	38.40	2.084	0.849
		D	141	0.710925	-	-	-	-	-	-
71	Gals-74	E	174	0.709379	0.10	18.15	15.58	38.62	2.128	0.858

Table A2 Results table for archaeological animal tooth samples

Sample No.	Sample code	Sample* material	Sr ppm	⁸⁷Sr/⁸⁶Sr normalised	Pb ppm	²⁰⁶Pb/²⁰⁴Pb	²⁰⁷Pb/²⁰⁴Pb	²⁰⁸Pb/²⁰⁴Pb	²⁰⁸Pb/²⁰⁶Pb	²⁰⁷Pb/²⁰⁶Pb
101	IASH-1	E	656	0.709708	0.04	17.98	15.56	38.34	2.133	0.865
102	IARD-1	E	470	0.709408	0.02	16.96	15.50	36.98	2.180	0.914
103	IACAT-1	E	429	0.710154	0.02	17.91	15.49	38.79	2.166	0.865
104	NCAT-1	E	355	0.709935	0.16	18.37	15.59	38.42	2.092	0.849

Table A3 Results table for modern human tooth samples

Sample No.	Subject	Sample* material	Sr ppm	⁸⁷ Sr/ ⁸⁶ Sr normalised	Pb ppm	²⁰⁶ Pb/ ²⁰⁴ Pb	²⁰⁷ Pb/ ²⁰⁴ Pb	²⁰⁸ Pb/ ²⁰⁴ Pb	²⁰⁸ Pb/ ²⁰⁶ Pb	²⁰⁷ Pb/ ²⁰⁶ Pb
201	CM2	e	-	-	0.97	17.91	15.75	38.21	2.134	0.880
		d	56.4	0.709053	0.77	17.89	15.76	38.19	2.134	0.881
202	BAB1	E	45.8	0.710238	2.92	18.47	15.61	38.18	2.067	0.845
		SE	43.2	0.710236	4.66	18.52	15.61	38.19	2.062	0.843
		D	36.0	0.710200	7.31	18.55	15.61	38.21	2.060	0.842
		B	36.0	0.709300	1.52	18.48	15.61	38.11	2.062	0.845
203	BAB2	E	49.5	0.710285	2.87	18.51	15.61	38.19	2.063	0.844
		E	44.9	0.710281	2.23	-	-	-	-	-
		E	46.0	0.710279	2.30	18.52	15.63	38.23	2.064	0.844
		E	44.1	0.710271	2.86	18.48	15.60	38.14	2.064	0.844
		<i>E</i>	<i>46.1</i>	<i>0.710280</i>	<i>2.56</i>	<i>18.50</i>	<i>15.62</i>	<i>38.18</i>	<i>2.064</i>	<i>0.844</i>
204	AM1	e	67.8	0.709299	0.30	17.96	15.70	38.02	2.116	0.874
		e	75.1	0.709283	-	-	-	-	-	-
		e	73.2	0.709302	0.18	17.80	15.56	37.59	2.111	0.874
		<i>e</i>	<i>72.0</i>	<i>0.709295</i>	<i>0.24</i>	<i>17.88</i>	<i>15.63</i>	<i>37.80</i>	<i>2.114</i>	<i>0.874</i>
		d	61.4	0.709310	0.39	17.84	15.56	37.63	2.109	0.872
205	AM2	e	70.0	0.709303	0.24	17.84	15.59	37.65	2.110	0.874
		e	62.7	0.709273	0.32	17.87	15.59	37.65	2.107	0.872
		e	77.6	0.709278	-	17.81	15.56	37.60	2.111	0.874
		<i>e</i>	<i>70.1</i>	<i>0.709285</i>	<i>0.28</i>	<i>17.84</i>	<i>15.58</i>	<i>37.63</i>	<i>2.109</i>	<i>0.873</i>
206	MN	e	42.5	0.715756	1.10	17.62	15.72	37.87	2.149	0.892
		d	24.9	0.712030	2.53	17.69	15.74	37.97	2.146	0.889

Figures in italics are means of enamel samples taken from same tooth

Table A4 Results table for soil and rock leaches

Sample No.	Sample code	Leach reagent	Sr ppm	⁸⁷ Sr/ ⁸⁶ Sr normalised	Pb ppm	²⁰⁶ Pb/ ²⁰⁴ Pb	²⁰⁷ Pb/ ²⁰⁴ Pb	²⁰⁸ Pb/ ²⁰⁴ Pb	²⁰⁸ Pb/ ²⁰⁶ Pb	²⁰⁷ Pb/ ²⁰⁶ Pb
301	BF-S1	water	-	0.709976	-	no Pb detectable				
	BF-S1	acetic	-	0.709506	-	18.46	15.63	38.43	2.082	0.847
	BF-S1	HCl	-	0.710296	-	18.47	15.63	38.44	2.082	0.846
302	CNIP-S1	water	-	0.709675	-	no Pb detectable				
	CNIP-S1	acetic	-	0.709173	-	19.08	15.51	39.58	2.075	0.813
303	CNIP-S2	water	-	0.710421	-	19.20	15.54	40.30	2.099	0.809
	CNIP-S2	acetic	-	0.709174	-	19.14	15.45	39.74	2.076	0.807
304	CNIP-S3	water	-	-	-	17.66	15.56	37.40	2.117	0.881
	CNIP-S3	acetic	-	0.709195	-	19.13	15.50	39.57	2.069	0.810
305	CNIP-S4	water	-	0.715205	-	20.14	15.29	36.20	1.797	0.759
	CNIP-S4	acetic	-	0.710096	-	20.65	15.45	36.75	1.779	0.748
306	WH-C	water	-	0.707414	-	no Pb detectable				
	WH-C	acetic	-	0.707408	-	18.62	15.60	38.62	2.074	0.838
307	WH-S	water	-	0.708379	-	18.32	15.59	38.21	2.086	0.851
	WH-S	acetic	-	0.708245	-	18.17	15.57	38.03	2.094	0.857
308	SK2-S	water	-	0.709314	-	18.46	15.60	38.37	2.078	0.845
	SK2-S	acetic	-	0.710540	-	18.47	15.62	38.39	2.079	0.846
309	WIN-C	water	-	0.707561	-	18.08	15.36	37.64	2.082	0.850
	WIN-C	acetic	-	0.707362	-	19.07	15.77	39.04	2.048	0.827
	WIN-C	HCl	-	0.707369	-	18.82	15.64	38.60	2.051	0.831
310	Gals-S4	water	-	0.709377	-	17.16	15.21	40.57	2.365	0.887
	Gals-S4	acetic	-	0.709167	-	17.67	15.37	39.69	2.246	0.870
311	Gals-S5	water	-	0.710543	-	16.76	15.09	41.44	2.472	0.900
	Gals-S5	acetic	-	0.709376	-	16.66	15.06	41.51	2.492	0.904
312	MW-C	water	-	0.707544	-	no Pb detectable				
	MW-C	acetic	-	0.707501	-	18.92	15.66	38.70	2.045	0.828
	MW-C	HCl	-	0.707496	-	18.96	15.66	38.78	2.045	0.826
313	MW-S1	water	-	0.707645	-	18.60	15.78	38.62	2.077	0.849

Sample No.	Sample code	Leach reagent	Sr ppm	$^{87}\text{Sr}/^{86}\text{Sr}$ normalised	Pb ppm	$^{206}\text{Pb}/^{204}\text{Pb}$	$^{207}\text{Pb}/^{204}\text{Pb}$	$^{208}\text{Pb}/^{204}\text{Pb}$	$^{208}\text{Pb}/^{206}\text{Pb}$	$^{207}\text{Pb}/^{206}\text{Pb}$
	MW-S1	acetic	-	0.707544	-	18.99	15.68	38.77	2.041	0.826
	MW-S1	HCl	-	0.708185	-	18.98	15.66	38.81	2.045	0.825
314	MW-S2	water	-	0.707662	-	no Pb detectable				
	MW-S2	acetic	-	0.707530	-	19.01	15.67	38.76	2.039	0.825
	MW-S2	HCl	-	0.708099	-	19.02	15.66	38.84	2.042	0.823

APPENDIX II

Site and sample tables

- A5 List of archaeological sites investigated
- A6 List of archaeological human tooth samples
- A7 List of archaeological animal tooth samples
- A8 List of modern human tooth samples
- A9 List of soil and rock samples

Table A5 List of archaeological sites investigated

Site	Type	Excavated	Period	No. of Individuals Analysed	No. of Teeth Analysed
1. Blackfriars, Gloucester	Priory graveyard	1991	C13-C16 AD	5	6
2. Cnip, Isle of Lewis	Burial ground eroding intermittently from sand dune	1979 onwards	C9-C10 AD Bronze Age	5 1	5 1
3. West Heslerton, North Yorkshire	Burial ground associated with Anglian settlement	1977 to 1987	C5-C7 AD Iron Age Neolithic/EBA	32 2 6	33 2 6
4. Mangotsfield, Bristol	Single limestone sarcophagus	1997	C4 AD (Late Roman)	2	4
5. Spitalfields, London	Single lead coffin from multi-period site	1998	Late Roman	1	1
6. Eagle Hotel, Winchester	Cemetery	1998	C4 AD (Late Roman)	4	5
7. Galson, Isle of Lewis	Burial ground eroding intermittently from shoreline	1946 onwards	C3-C4 AD (Iron Age)	5	5
8. Monkton-up- Wimbourne, Dorset	Henge-type monument	1997	Neolithic Bronze Age	4 1	7 1

Table A6 List of archaeological human tooth samples

No.	Skeleton code	Tooth	Sex	Age at death	Tooth Preservation Scores ^a			
					Root	Attrition	Enamel	Dentine
1. Blackfriars, Gloucester BL-19/91: C13-C16 AD burials								
1	77	P ₁ R	F	Y Ad	5	2	2	3
2	89	P ₁ R	n/k	AO	5	2	2	3
3	209	P ₁ L	M?	Y-M Ad	5	2	2	3
4	341	P ₁ L	M	AO	5	2	2	3
5	341	P ₁ R	M	AO	5	2	2	3
6	357	P ₂ L	n/k	Y Ad	5	3	2	3
2. Cnip, Isle of Lewis: C9-C10 AD Norse burials								
7	A	P ¹ L	F	M Ad	5	3	2	2
8	B	I ¹ L	n/k	C	2	0-1	4	4
9	C	P ₁ ^b	M	M Ad	5	6-7	5	5
10	D	P ¹ R	M	M Ad	5	5	2	2
11	D	C ¹ R	M	M Ad	5	4	2	2
12	E	P ¹ L	F	M Ad	5	4	3	3
13	F	di ¹ L	n/k	I	2	0-1	6	6
14	G	di ¹ R	n/k	I	0	0	6	6
15	BA	C ¹ R	M	M Ad	5	6	4	4
3. West Heslerton, North Yorkshire: C5-C7 Anglian burials								
16	G73	M ₂ L	Mgg ^c	M-O Ad	5	3	5	5
17	G74	P ¹ R	Mgg	Y Ad	5	4	5	5
18	G75	M ² R	Mgg	Ad	5	5-6	5	5
19	G78	P ² R	F	Y Ad	5	2	2	3
20	G84	M ₃ L	F	Y Ad	X	1	4	5
21	G89	P ¹ L	?F	Y Ad	5	2	2	2
22	G97	M ² R	Fgg	C	1	0	3	4
23	G97	dm ² L	Fgg	C	6	3	2	3
24	G98	M ₂ L	Mgg	C	0	0	6	6
25	G100	M ¹ R	Fgg	I-C	1	0	2	3

^a see p120-122 for explanation of scores

^b tooth could not be fully identified

^c gg indicates gender attributed using grave goods only e.g. weapons = male, jewellery = female

No.	Skeleton code	Tooth	Sex	Age at death	Tooth Preservation Scores ^a			
					Root	Attrition	Enamel	Dentine
26	G101	P ₂ L	M ^d	C	0	0	6	6
27	G102	M ³ R	F ^d	Y Ad	5	2	2	3
28	G109	M ¹ L	M	Y Ad	5	4	2	2
29	G113	M ² R	F	Y Ad	5	2	2	2
30	G114	M ^{1or2} L ^b	F	Y Ad	5	4	4	4
31	G115	M ₃ L	?M	Y Ad	5	2	3	3
32	G117	M ² L	Fgg	AO	4-5	1	3	5
33	G122	M ² L	Fgg	AO	5	2	4	4
34	G132	M ₃ R	M ^d	AO	5	1	2	3
35	G133	P ¹ L	F	Y-M Ad	X	4	4	5
36	G139	M ² R	F	Y Ad	5	2	3	3
37	G144	P ¹ L	F	M Ad	5	3	3	3
38	G145	M ¹ L	M	Ad	5	5	3	3
39	G149	P ₁ L	M	M Ad	5	4	4	4
40	G151	M ₃ L	Mgg	Y Ad	X	2	5	5
41	G154	M ¹ L	Fgg	C	5	2	4	4
42	G158	C ¹ R	M	Y-M Ad	5	3	3	4
43	G159	M ₂ L	F	Y Ad	X	2	4-5	5
44	G162	M ₁ L	Fgg	C	4	2	4	5
45	G164	P ₁ L	F	Ad	5	3	4	4
46	G166	M ² R	F	Ad	5	2	4	5
47	G169	M ₁ L	n/k	I	0	0	6	6
48	G173	M ³ R	Fgg	Ad	X	1	4	5
3. West Heslerton, North Yorkshire: Iron Age burials								
49	WHIA-1	P ¹ R	n/k	Ad	5	2	3	3
50	WHIA-2	P ₁ R	M	Y Ad	5	2	2	2
3. West Heslerton, North Yorkshire: Neolithic/EBA burials								
51	IR266	P ₁ L	n/k	C	4	1	2	3
52	IR271	P ₁ L	n/k	C	4-5	2	2	2
53	IR304	P ₂ R	n/k	C	4	1	2	2
54	2BA229	M ¹ R	M	Ad	5	6	3	2
55	2BA283	M ³ R	F	Ad	5	2	2	2
56	2BA589	M ³ R	n/k	Ad	5	2	3	3

No.	Skeleton code	Tooth	Sex	Age at death	Tooth Preservation Scores ^a			
					Root	Attrition	Enamel	Dentine
4. Mangotsfield, Bristol SGSMR 11017: C4 AD Late Roman burials								
57	SK1a	C ¹ R	M	M Ad	5	4	3	3
58	SK1b	C ¹ L	M	M Ad	5	2	3	3
59	SK2a	P ₂ R	F	O Ad	5	4	5	5
60	SK2b	C ₁ R	F	O Ad	5	5	2	2
5. Spitalfields, London SPR98-15903: Late Roman burial								
61	SPR-1	P ₂ L	F	Y Ad	5	2	3	2
6. Eagle Hotel, Winchester EHW: C4 AD Late Roman burials								
62	G318	P ¹ R	M	Ad	5	2	2	2
63	G319	P ₁ L	F	Ad	5	3	2	3
64	G326	P ¹ R	M	Ad	5	4	2	2
65	G339a	M ³ R	M	Ad	5	4	2	3
66	G339b	P ₂ R	M	Ad	5	3	2	3
7. Galson, Isle of Lewis: C3-C4 AD Iron Age burials								
67	Gals-93	P ₁ R	?M	Ad	5	4	3	3
68	Gals-96	P ₁ R	?M	Ad	5	4	3	3
69	Gals-II	P ₁ L	F	Y Ad	5	3	2	2
70	Gals-IV	P ¹ L	F	Y Ad	5	4	2	3
71	Gals-74	C ¹ L	M	Ad	5	5-6	4	3
8. Monkton-up-Wimbourne, Dorset MUW-97: Neolithic burials								
72	F23A	dc ¹ R	F ^d	C	5	3	2	3
73	F23A	M ¹ R	F ^d	C	2	0	2	2
74	F23B	dc ¹ L	M ^d	C	6	4	2	3
75	F23B	P ¹ L	M ^d	C	2	0	2	2
76	F23C	P ² R	F	Y-M Ad	5	5	2	3
77	F23D	dc ¹ L	F ^d	C	7	5	2	3
78	F23D	C ¹ L	F ^d	C	4	1	2	3
8. Monkton-up-Wimbourne, Dorset MUW-97: Bronze Age burial								
79	F23E	P ₁ L	M	M Ad	5	6	3	3

^d Sexing result from aDNA analysis (Christine Flaherty pers. comm.)

Table A7 List of archaeological animal tooth samples

Cnip, Isle of Lewis: Herbivore teeth						
No.	Sample code	Period	Type	Tooth	Preservation^a	
					Enamel	Dentine
101	IASH-1	Iron Age	sheep	Molar	2	3
102	IARD-1	Iron Age	red deer	Molar	2	3
103	IACAT-1	Iron Age	cattle	Molar	2	3
104	NCAT-1	Norse	cattle	Molar	2	3

Table A8 List of modern human tooth samples

No.	Subject	Sample	Tooth	Sex	Age^c	Mechanism for loss	Root	Attrition
201	CM	2	dc ₁ L	F	11	exfoliated	9	4
202	BAB	1	M ³ R	F	Adult	extracted	5	1
203	BAB	2	M ₃ R	F	Adult	extracted	5	1
204	AM	1	dm ² R	F	9	extracted	5	2
205	AM	2	dm ₂ L	F	9	extracted	5	2
206	MN	1	di ₂ L	F	9	exfoliated	9	5

^c Age as at 31/12/2001

Table A9 List of soil and rock samples

No.	Sample Code	Site No.	Site name	Sample	Location
301	BF-S1	1	Blackfriars, Gloucester	soil	Burial context
302	CNIP-S1	3	Cnip, Isle of Lewis	sand	Norse burial context
303	CNIP-S2	3	Cnip, Isle of Lewis	sand	Bronze Age burial context
304	CNIP-S3	3	Cnip, Isle of Lewis	sandy soil	Norse cultivation area
305	CNIP-S4	3	Cnip, Isle of Lewis	gneiss	Bedrock
306	WHC	4	West Heslerton, Yorks.	Cretaceous chalk	Bedrock
307	WHS	4	West Heslerton, Yorks.	Sand	Burial context
308	SK2-S	5	Mangotsfield, Bristol	Soil	Burial context
309	WIN-C	7	Eagle Hotel, Winchester	Cretaceous chalk	Bedrock/ burial context
310	Gals-S4	8	Galson, Isle of Lewis	Sand	Burial context
311	Gals-S5	8	Galson, Isle of Lewis	Sandy soil	Cultivation area
312	MW-C	10	Monkton-up-Wimbourne	Cretaceous chalk	Bedrock/Neolithic burial context
313	MW-S1	10	Monkton-up-Wimbourne	Chalky soil	Bronze Age burial context
314	MW-S2	10	Monkton-up-Wimbourne	Chalky soil	Soil from base of Neolithic shaft

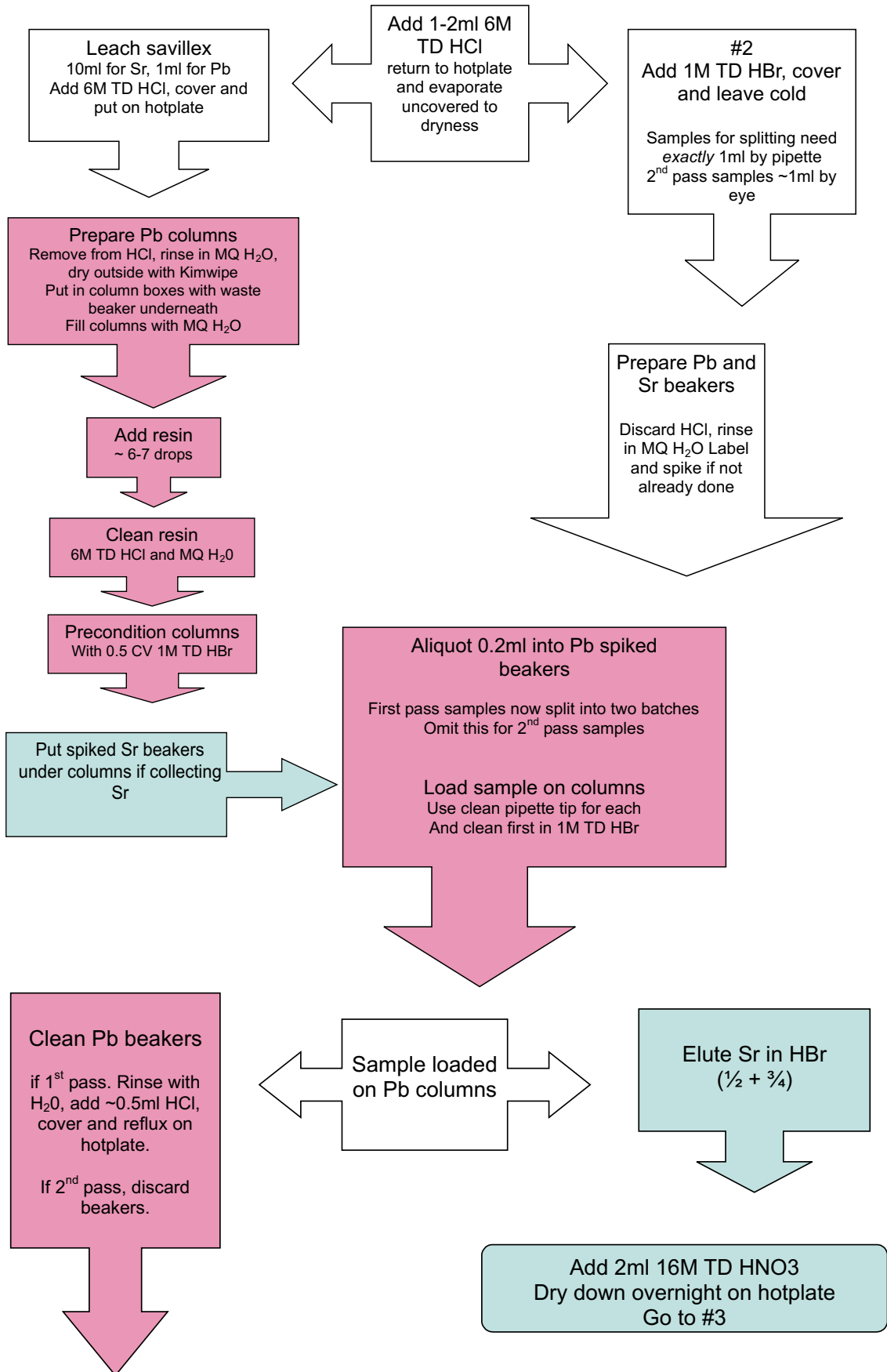
APPENDIX III

FLOW CHART FOR LABORATORY PROCEDURE

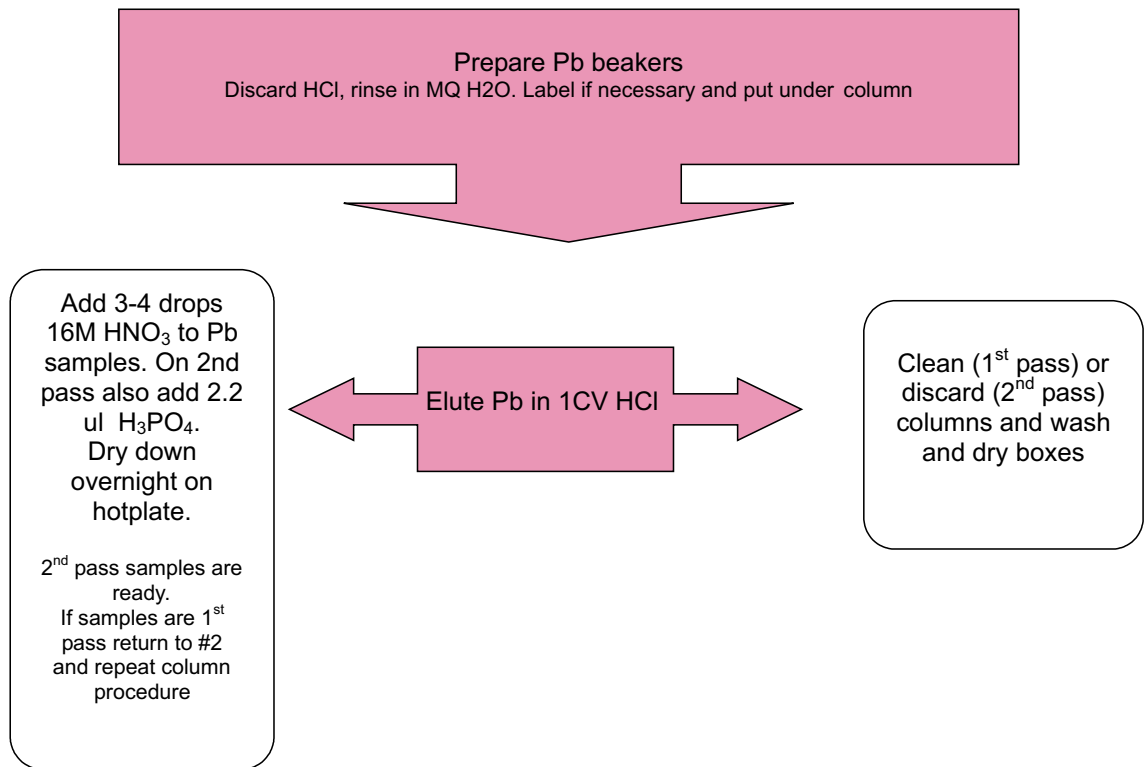
Teeth preparation for TIMS/ICP-MS - DAY 1



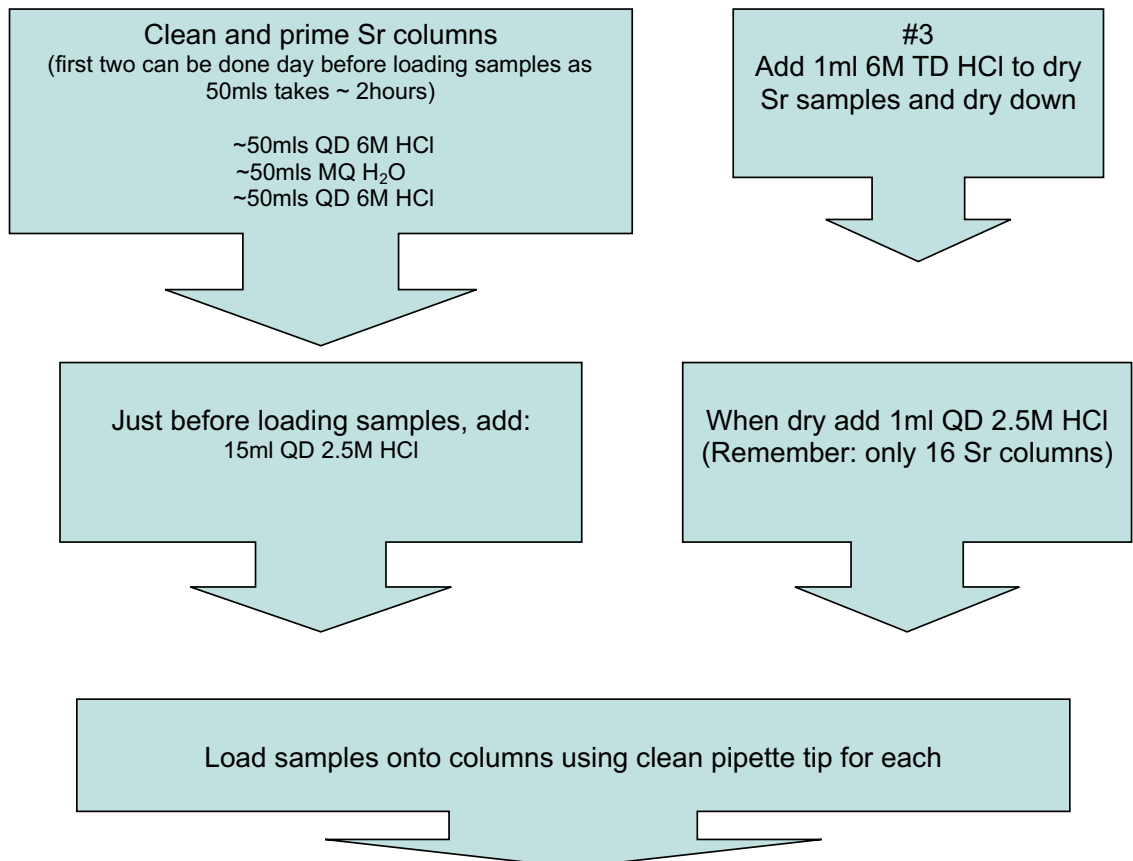
Teeth preparation for TIMS/ICP-MS - DAY 2/3



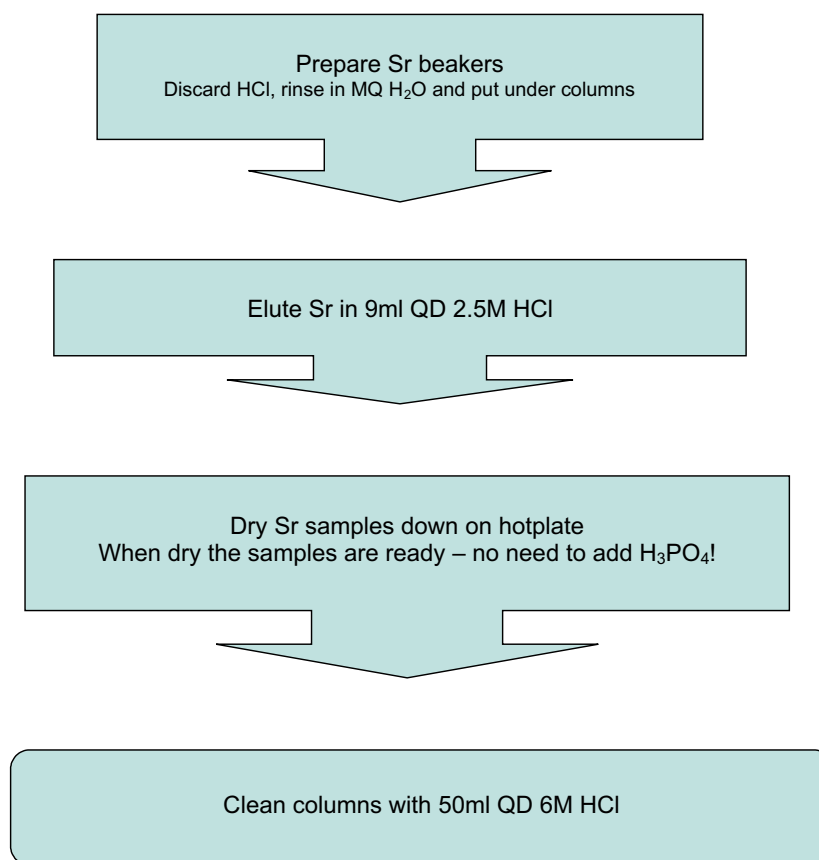
Teeth preparation for TIMS/ICP-MS - DAY 2/3



Teeth preparation for TIMS/ICP-MS - DAY 4/5



Teeth preparation for TIMS/ICP-MS - DAY 4/5



Day 1: weigh, clean, dissolve, dry down

Day 2: dry down HCl, HBr, split, 1st pass spiked batch

Day 3: 2nd pass spiked batch, 1st pass unspiked batch

Day 4: 2nd pass unspiked batch, Sr

Day 5: Sr

APPENDIX IV

GLOSSARY OF TERMS

<i>aetiology</i>	the cause of a disease or disorder
<i>alveolar</i>	pertaining to the section of the jaw containing the tooth sockets
<i>ameloblast</i>	cells which secrete amelogenin and orchestrate enamel formation
<i>amelogenesis</i>	the process of enamel formation
<i>amelogenin</i>	the main protein of the developing enamel matrix
<i>Anglian</i>	the material culture in eastern England during the Early Anglo-Saxon period ~450-700AD
<i>ante-mortem</i>	before death
<i>antimere</i>	one of the halves of a bilaterally symmetrical structure, especially used of teeth, e.g. the antimere of the upper left canine is the upper right canine (Buikstra and Ubelaker 1994, 177)
<i>attrition</i>	tooth to tooth wear through use
<i>abrasion</i>	wear accelerated by repeated contact with foreign materials, e.g. tools, pipes, hair-grips, thread
<i>bicuspid</i>	a tooth with two cusps/points, i.e. a premolar
<i>bioavailability</i>	the effects of any process, geochemical, physicochemical or physiological, which influences the fraction of an ingested trace element ultimately presented to tissues in forms that can be used to meet functional demands
<i>biogenic</i>	developing or produced by living organisms
<i>brachycephaly/ic</i>	describes broad or round skulls of the living with a cephalic index of 80 – 84.99 (Bass 1987, 69)
<i>brachycrany/ic</i>	describes broad or round crania with a cranial index of 80 – 84.99 (Bass 1987, 69)
<i>Bronze Age</i>	The first age of metals. In England ~4700 – 2900BP, overlaps with the preceding Neolithic
<i>buccal</i>	towards or adjacent to the cheek, i.e. the surface of a tooth which faces towards the cheek, used with premolars and molars
<i>calcification</i>	hardening of tissue by impregnation with (predominantly) calcium salts
<i>caries</i>	tooth decay
<i>cementum</i>	a layer of bony tissue covering the root of the tooth which anchors the tooth in its socket
<i>cephalic index</i>	a measure of head shape, i.e. front to back and side to side not of skull height) in living individuals
<i>cervical enamel</i>	the thin enamel at the base of the tooth crown nearest the gums
<i>chalcophile</i>	a geochemical classification for “sulphide-loving” elements
<i>circumpulpal dentine</i>	the dentine surrounding the central pulp cavity, may be primary or secondary dentine
<i>cortical bone</i>	the thin, dense outer layer of bone also known as compact bone
<i>country rock</i>	rocks which contain no mineralisation
<i>cranial index</i>	a measure of shape (i.e. front to back and side to side not of vault height) of skeletal crania
<i>cribra orbitalia</i>	pits visible on the superior aspect of the orbital surface considered to be an indicator of iron deficiency anaemia
<i>crown (tooth)</i>	that part of the tooth covered with enamel. This is the anatomical crown and the definition used in this thesis. The clinical crown is that part of the tooth visible within the oral cavity.
<i>crypt</i>	the recess within the alveolar bone where a tooth forms until ready to erupt
<i>crystallinity</i>	general term which signifies large size, absence of structural defects and minimal strain – qualities which tend to be found together (taken from Sillen & Sealy 1995 p 314)
<i>crystallites (enamel)</i>	immature, thin enamel crystals that seed during the formation stage
<i>crystals (enamel)</i>	mature enamel crystals that have grown to full thickness during the maturation stage
<i>cuspid</i>	a prominence or projection on the occlusal surface of a tooth
<i>deciduous dentition</i>	a tooth having one point, i.e. incisors and canines
	the first set of teeth to form and erupt, also known as primary, baby or milk teeth

<i>diagenesis/tic</i>	a multitude of processes or effects of processes both macroscopic and microscopic that occur in buried skeletal remains and can destroy or add material and information (Millard, 1998, 96)
<i>distal</i>	the surface of the tooth which lies against an adjoining tooth and faces away from the median line
<i>dolichocephaly/ic</i>	describes narrow or long skulls of the living which have a cephalic index of ≤ 74.99 (Bass 1987, 69)
<i>dolichocrany/ic</i>	describes narrow or long crania which have cranial index of ≤ 74.99 (Bass 1987, 69)
<i>EBA</i>	Early Bronze Age. In England ~ 4700 – 4000 BP, overlaps with the preceding Neolithic period
<i>EDJ</i>	enamel-dentine junction
<i>enamel-dentine junction</i>	the complex interface between the enamel and dentine tissues
<i>epithelial</i>	a layer of cells which forms the covering of most internal surfaces and organs
<i>end members</i>	two (or more) sources of material which have specific, different, isotope compositions, that are mixed in varying proportions to produce a mixture which has isotope values intermediate between that of its sources
<i>enthesis</i>	the area of attachment of a muscle tendon to bone
<i>enthesophytes</i>	bony projections or spicules of bone at sites of tendonous or ligamentous attachment, also called osteophytes
<i>enthesopathy</i>	a pathological enthesitis, a musculo-skeletal marker of stress
<i>epiphysis/epiphyseal</i>	the end of a long bone and separated from the metaphysis by cartilage until growth is complete
<i>erosion (of the enamel)</i>	chemical dissolution of the mineral phase either in the mouth or during burial
<i>exchangeable cations</i>	cations held in the bound hydration layer of soil (more tightly held and more highly concentration than the soluble cations in the bulk solution)
<i>fissure</i>	a long cleft between cusps or ridges
<i>formation (of enamel)</i>	the initial process of morphologically forming the immature and incompletely mineralised enamel which occurs before the process of maturation completes the mineralisation process
<i>exfoliation</i>	the natural loss of a deciduous tooth, usually prior to the eruption of its permanent replacement
<i>genotype/ic</i>	the genetic make-up of an individual
<i>hypertrophy</i>	the over-development of a muscle or bone in response to activity, abnormal enlargement/growth
<i>hypoplasia (enamel)</i>	abnormal lines or pits on the enamel surface thought to result from growth disturbances during enamel formation
<i>in utero</i>	indicates biological processes occurring in the womb
<i>in vitro</i>	indicates biological processes made to occur in an artificial environment outside the living organism
<i>in vivo</i>	indicates biological processes or experiments conducted or occurring within the living organism
<i>Iron Age</i>	The second age of metals. In England ~3000 – 2000BP. In the Outer Hebrides it can be extended until the arrival of the Norse ~780AD
<i>labial</i>	towards or adjacent to the lips, i.e. the labial surface of a tooth is that next to lips, used with incisors and canines
<i>lingual</i>	towards or adjacent to the tongue, i.e. the lingual surface of a tooth is that side next to the tongue
<i>lithophile</i>	a geochemical classification meaning “silicate loving”
<i>mamelons</i>	raised mounds (usually 2 or 3) on the cusps of newly erupted incisors which are removed through use
<i>mandibular</i>	pertaining to the mandible or lower jaw
<i>maturation (of enamel)</i>	the period of time after morphological formation during which the tooth enamel is mineralised and hardened
<i>maxillary</i>	pertaining to the maxilla or upper jaw

<i>mesial</i>	towards the centre line, e.g. of the body – the mesial incisor is the first or central incisor and the one nearest to the centre line
<i>mesenchyme</i>	the part of the embryonic mesoderm from which connective tissue, cartilage and the circulatory and lymphatic systems develop
<i>mesocephaly/ic</i>	describes skulls of the living which are intermediate between brachycephalic and dolichocephalic, having a cephalic index of 75-79.99 (Bass 1987, 69)
<i>mesocrany/ic</i>	describes crania which are intermediate between brachycranial and dolichocranial with a cranial index of 75 – 79.99 (Bass 1987, 69)
<i>mesoderm</i>	see mesenchyme
<i>Mesolithic</i>	The Middle Stone Age. In England ~10,000 – 6000BP
<i>Migration Period</i>	The age of migrations in continental Europe ~400-700AD
<i>mineralisation</i>	the hardening of skeletal tissue by impregnation with (predominantly) calcium salts, also known as calcification and in enamel, maturation
<i>morphogenesis</i>	embryological development of the structure of an organism or part
<i>Neolithic</i>	The New Stone Age. In England ~6300 – 4200BP
<i>non-metric trait</i>	a type of discrete human variation which is usually recorded as present or absent rather than being of a measurable quantity and can be genetic, environmental or activity related
<i>Norse period</i>	in the Western Isles ~780 – 1100, late Norse period ~1100 – 1300AD
<i>occlusal</i>	pertaining to the tooth surfaces involved in bringing the teeth together in proper alignment, i.e. the biting or chewing surfaces
<i>odontoblasts</i>	dentine forming cells
<i>osteoid</i>	immature skeletal tissue resembling bone but not fully mineralised
<i>pellicle</i>	thin skin or film such as an organic membrane or liquid film
<i>peri-mortem</i>	occurring around the time of death
<i>permanent dentition</i>	the secondary, adult set of teeth
<i>phenotype/ic</i>	the observable or detectable physical characteristics of an individual, i.e. the expression of the genotype
<i>post-mortem</i>	occurring after death
<i>primary dentine</i>	the dentine formed and mineralised when the tooth was first formed and mineralised
<i>pulp cavity</i>	the internal, central cavity of the tooth root that contains nerves and blood vessels and pulp tissue
<i>Roman/Romano-British</i>	The period under Roman rule 43 –410AD
<i>root apex/apices</i>	the end of the tooth root where the small entry and exit hole for nerves and blood vessels is located
<i>root dentine</i>	the part of the tooth which lies within the alveolus and <i>in vivo</i> , is usually covered by cementum, i.e. excludes the dentine of the tooth crown
<i>root sclerosis</i>	see root translucency
<i>root translucency</i>	increasing transparency which starts at the root apex and proceeds up the tooth root with advancing age caused by the deposition of mineral within primary dentinal tubules (Hillson, 1986, 153)
<i>resorption</i>	the removal by dissolution and absorption of deciduous tooth roots prior to exfoliation
<i>secondary dentine</i>	dentine laid down in later life lining the pulp cavity in response to mechanical loading and stress and in advance of crown attrition
<i>soluble cations</i>	cations in the bulk soil solution extractable with water and present in lower concentration than exchangeable cations in the soil hydration layer (Pate and Hutton, 1988, 731]
<i>trabecular bone</i>	vascular bone which fills the medullary cavity and ends of long bones in adulthood, also called cancellous or spongy bone
<i>Treponematosi</i>	an infectious disease caused by the treponema genus of spirochetes which has different clinical manifestations (i.e. pinta, yaws, endemic syphilis and venereal syphilis) in different geographical areas (Roberts and Manchester 1995, 150)
<i>varve</i>	a layer of sediment deposited in one year
<i>Viking Age</i>	in the Hebrides ~780 – 1100AD