**Supplementary Methodological Detail**

*MtDNA preparation and analysis*

The third molar from E224 was logged into the database at the dedicated aDNA lab at the University of Otago (Knapp *et al.* 2012), as sample number MS10669 and processed. After sterilization via bleach and UV exposure, DNA was extracted from ~200mg of ground tooth using a standard silica-based protocol; libraries were prepared and the mitochondrial genome was enriched via a modified in-solution hybrization capture; the enriched library was sequenced on an Illumina MiSeq platform; and sequencing data were processed all as described previously (Matisoo-Smith *et al.* 2016). Fragment length and damage patterns, obtained using MapDamage (Ginolhac *et al.* 2011), were consistent with ancient DNA samples of historic age.

*Sampling procedure for 13C and 15N analysis of dentine*

The sampled tooth was abraded with a rose-head dental burr to remove surface contamination, and enamel was removed and reserved for strontium analysis. The prepared tooth was then cut in half along its long axis with a diamond-tipped cutting blade to create a single-rooted longitudinal section. The resultant half-section was embedded in a 50:50 mix of dental plaster and sectioned on the transverse plane using a Buehler Isomet 1000 precision saw fitted with a diamond abrasive wafering blade, a cooling water bath, and a digital micrometer set to 1mm, following Method 1 described by (Beaumont *et al.* 2013).

*Analytical procedure for 13C and 15N analysis*

Collagen from both bone and dentinal increments was prepared using a modified Longin method detailed in King et al. (2020). Samples were initially demineralised in 0.5M HCl at low temperature, prior to being gelatinized by heating in a pH 3 HCl solution at 70oC for 24–48 hr. Gelatinized collagen from bone samples was filtered using Ezee filters (Elkay, United Kingdom) and then lyophilized. Gelatinized increments were centrifuged rather than filtered prior to lyophilzation due to their small sample size.

All collagen samples were analysed at the Stable Isotope Biochemistry Laboratory (SIBL, Durham University) using a Costech Elemental Analyser (ECS 4010) connected to a Thermo Scientific Delta V Advantage isotope ratio mass spectrometer. Carbon isotope ratios were corrected for 17O contribution and reported in standard delta (δ) notation in per mil (‰) relative to Vienna Pee Dee Belemnite (VPDB). Isotopic accuracy was monitored through the daily analysis of in-house standards and international standards (e.g., IAEA-CH-3, IAEA-CH-6, IAEA-CH-7, IAEA-N-1, IAEA-N-2, NBS 24, USGS40). Analytical uncertainty for isotope measurements was <±0.1‰ (1 SD) for replicate analyses of standards and <0.2‰ (2 SD) on replicate sample analyses.

*Analytical procedure for 87Sr/86Sr analysis*

The sample was processed and analysed at the Arthur Holmes Isotope Geology Laboratory, University of Durham. Prior to mass spectrometry, strontium was purified from the enamel sample using established column chemistry methods (Font *et al.* 2008). In brief, the sample was dissolved overnight in Teflon Distilled (TD) 3M HNO3. The sample was then loaded onto a cleaned and preconditioned column containing ~60l of Eichrom Sr resin. The matrix was eluted to waste with TD 3M HNO3 followed by elution of the Sr fraction in 400l MQ H2O. The Sr fraction was acidified with TD Conc HNO3 to yield a 3% HNO3 solution.

The Sr isotope composition was measured on a ThermoFisher Neptune Multi Collector Inductively Coupled Plasma Mass Spectrometer (MC-ICP-MS). A Sr isotope measurement comprised a static multi-collection routine of a single block of 50 cycles with an integration time of 4s per cycle (total analysis time ~3.5mins). Instrumental mass bias was corrected for using an 88Sr/86Sr ratio of 8.375209 (the reciprocal of the more commonly used 86Sr/88Sr ratio of 0.1194) and an exponential law. Correction for isobaric interferences from Rb and Kr on 87Sr and 86Sr were performed using 85Rb and 83Kr as the monitor masses but were insignificant. The average 87Sr/86Sr ratio for the NBS987 isotope reference material during the analytical session was 0.710238 ±0.0000015 (2SD; n=11). Sr isotope data for E224 is normalised to an ‘accepted’ value for NBS987 of 0.71024.

Two total procedural blanks were also prepared and run alongside the sample in order to check for possible contamination, with both containing <15pg Sr (4 and 12 pg). The analysed E224 sample aliquot contained over 150ng Sr. The blank Sr contribution is therefore insignificant (~0.01%) given the very high Sr concentration in the sample.

References

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| --- | --- | --- | --- | --- | --- | --- |
| **sample** | **average age represented (years)** | **δ13C (‰, VPDB)** | **δ15N (‰, N2 AIR)** | **%C** | **%N** | **C:N** |
| E224 M3 01 | 9.1 | -19.2 | 11.8 | 43.4 | 15.6 | 3.2 |
| E224 M3 02 | 10.2 | -19.3 | 11.0 | 43.6 | 15.6 | 3.2 |
| E224 M3 03 | 11.3 | -19.4 | 11.3 | 44.5 | 15.9 | 3.3 |
| E224 M3 04 | 12.4 | -18.7 | 11.7 | 43.7 | 15.5 | 3.3 |
| E224 M3 05 | 13.5 | -18.8 | 11.4 | 43.0 | 15.2 | 3.3 |
| E224 M3 06 | 14.6 | -19.2 | 11.4 | 43.3 | 15.6 | 3.2 |
| E224 M3 07 | 15.8 | -19.0 | 11.6 | 43.7 | 15.5 | 3.3 |
| E224 M3 08 | 16.8 | -18.8 | 11.6 | 42.5 | 15.2 | 3.3 |
| E224 M3 09 | 17.9 | -19.3 | 11.7 | 41.9 | 15.2 | 3.2 |
| E224 M3 10 | 19.0 | -19.3 | 11.9 | 42.7 | 15.4 | 3.2 |
| E224 M3 11 | 20.1 | -19.2 | 12.0 | 42.7 | 15.3 | 3.2 |
| E224 M3 12 | 21.3 | -18.9 | 12.2 | 42.5 | 15.3 | 3.2 |
| E224 M3 13 | 22.4 | -19.0 | 12.1 | 43.0 | 15.5 | 3.2 |
| E224 Rib | 10 years before death (adulthood) | -18.2 | 10.7 | 41.6 | 15.2 | 3.2 |

**Supplementary Table 1:** Results of dietary isotope analysis in this study. All values are means of results from duplicate analyses. In this sample the technical error of measurement (TEM, calculated from repeat samples) is <0.1‰ on both δ13C and δ15N. All results fall within acceptable ranges of C:N (2.9 - 3.6), %C (35 – 50%), and %N (11- 16%) as established by DeNiro & Hastorf (1985).

Reference:

Deniro, M. & Hastorf, C. 1985. Alteration of 15N/14N and 13C/12C ratios of plant matter during the initial stages of diagenesis: Studies utilizing archaeological specimens from Peru. *Geochima et Cosmochima Acta,* 49: 97-115.