The archive version of the text can be obtained from the project archive on the Archaeology Data Service (ADS) website, after agreeing to their terms and conditions: ads.ahds.ac.uk/catalogue/resources.html?sfs_ba_2007 > Downloads > Documents > Final Reports. From here you can download the file 'Schulting,_Sand_teeth.pdf'.

### 3.10.1 Introduction

Three human teeth were found during the excavations at Sand, of which two were submitted for further analysis (see Table 134, below). One, a permanent central incisor was found in a high spit (Spit 3) in Context 13, the main midden, but direct dating indicates that it is not associated with the Mesolithic deposits, and dates instead to the Early Bronze Age (2115–1690 cal BC including a correction for the marine reservoir effect, see below and Section 4). The date of the other tooth from Context 13, a deciduous molar, is unknown. As the root is missing, no dating is possible for this specimen, but it was found not far from the adult tooth and may well be contemporary. The third tooth, another deciduous tooth, came from Context 29 slightly above the main midden and not far from the other two.

Table 134

| Sand 2000 Square | Context | Tooth | Comments |
|---|---|---|---|
| B1A, Spit 3 | 13 | Permanent central incisor | Dated: AA-50698 2040–1730 cal BC |
| B25A NE, Spit 4 | 13 | Deciduous tooth | Root missing |
| A3B SE, Spit 2 | 29 | Deciduous tooth | Not analysed |

Table 134: Sand, catalogue of human teeth

### 3.10.2 Permanent maxillary central incisor

This is a large permanent, maxillary central incisor (see Illustration 479, right). The occlusal surface is moderately worn, with a line of dentine exposed (wear stage 3–4, using Smith 1984). Chipping on one edge appears to have occurred during life, as there is evidence of smoothing. As the incisors are rarely involved in heavy mastication, the chipping may reflect the use of the teeth for non-dietary purposes (for example, use of the mouth as a 'third hand' during manufacturing or other activities). No enamel hypoplasia is indicated.

Illus 479: Sand – permanent, maxillary central incisor, labial view

Examination with a light microscope at low/medium

magnification (30–100×) shows a series of striations on the labial surface. These certainly occurred in life rather than post-depositionally (there is almost a complete absence of similar striations on the lingual surface) and could relate either to dietary or non-dietary use of the anterior dentition, or, most probably, to some combination of the two. Incisors are rarely used for dental microwear studies, and so little in the way of comparative data is available. Ungar & Spencer (1999), however, have indicated that consistent patterns in incisor microwear can be used to differentiate Amerindian populations with different diets. Further work will have to be undertaken with a larger sample of British material before interpretation can be attempted. Even so, little can be said about one tooth in isolation.

### 3.10.3 Deciduous mandibular first molar

Illus 480: Sand – deciduous, mandibular right first molar, occlusal view (max length = 7.9mm)

The second tooth found comprises a deciduous, right mandibular first molar (see Illustration 480, left). Only the crown is present, so that it is not possible to comment on the stage of root development. However, the state of wear on the occlusal surface strongly indicates that the tooth was fully erupted, and it is likely to have been so for some years prior to death. Indeed, it is possible that this represents a shed tooth. The cusps are nearly entirely worn down, with dentine exposure across much of the occlusal surface. The most likely age range represented by the tooth is 8–10 years.

Illus 481: Sand – deciduous, mandibular right first molar, lingual view

Chipping on the lingual edge of the occlusal surface appears slightly worn, and so may have occurred during life, possibly indicating the consumption of quite hard foods from a relatively young age (though keeping in mind that the tooth is likely to be that of an older child). This is supported by the high degree of occlusal wear noted above. Chipping could also be caused by grit incorporated into foods through processing (for example, grit from a grinding slab, incorporated into dried fish or meat, sand in shellfish, and so on). No caries or enamel hypoplasia are present. A slight amount of calculus is present on the lingual surface of the tooth, near the enamel-cementum junction (see Illustration 481, right).

### 3.10.4 Dating and stable isotope data

The root of the permanent central incisor was sent for an AMS determination, returning a result of 2115–1690 cal BC (3615±65 BP; AA-50698). The associated $\eth^{13}C$ value of -8.5‰ suggests some input of marine protein in the diet of this individual, on the order of approximately 20%. This necessitates a slight correction for the marine reservoir effect (Barrett *et al* 2000a). The calibration was made using Calib 4.4 (McCormac *et al* 2002; Stuiver *et al* 1998) and taking this into account, and most likely falls within the range 2040–1730 cal BC. This places it within the Early Bronze Age.

Unlike bone, the dentine that makes up the tooth root is a very stable structure, with a very low turnover rate. Thus, the dietary signal largely refers to the time during which the root was being formed, in this case ages 4–8. Nevertheless, it is likely that this more or less is also representative of the adult diet of this individual and their community, if only for the reason that it is difficult (though by no means impossible) to envisage a situation in which young children would be eating more marine protein than adults in the same community. While a contribution on the order of 20% marine protein is far from insignificant, it is still a relatively minor proportion of the total protein intake.

In terms of broader comparisons, individuals dating to this period in Scotland are relatively rare. Of those that are known, the Sand tooth represents the highest ð$^{13}$C value yet found. There is an emerging pattern for most of post-Mesolithic Scottish prehistory, with ð$^{13}$C values above about –19‰ being essentially non-existent between 5000 and 2000 BP. After 2000 BP, a number of coastal sites, mainly from Orkney, have individuals with more elevated values, between –19‰ and –16‰ (Schulting & Richards 2002:Fig5). This is especially so in the Viking period, when the use of marine foods in Orkney becomes very significant (Barrett *et al* 2000b). The possibility of regional variation in earlier periods still exists, however, and perhaps the Sand tooth provides some indication of this.

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