The impact of immigrants into this country is currently a hot topic of debate in Britain, but **Jane Evans** suggests that it should be viewed from the perspective of human mobility over the past 5000 years.

From Stonehenge to the Gherkin

Isotope analysis of tooth enamel from humans is a rapidly developing technique for looking at the childhood origins of people from the past. It provides a direct measurement from the person and does not depend upon the assumption that artefacts within a burial provide a direct link with the person's origins. In other words, just because some one is buried with a Scandinavian sword does not mean the person themselves was from Norway or Sweden; the sword might have been a prized possession won in battle. Isotopes can distinguish between these two possibilities.

Strontium and oxygen are locked into tooth enamel when teeth mineralise in childhood and they are retained, unaltered through life. Because tooth enamel is resistant to change, this signature is also preserved throughout burial. Strontium, which is chemically similar to calcium, an element well known to be needed in tooth and bone development, is taken up in the diet but is ultimately derived from rocks, which weather into soils from where the element is taken up into the food chain by plants. The isotope variation in strontium across Britain is closely related to the age and type of underlying rocks. A map of strontium isotope variation in the biosphere across Britain has recently been published by BGS/NIGL (NERC Isotope Geosciences Laboratory) staff and collaborators and is the first of its kind to be produced. Oxygen in teeth is derived mostly from drinking water. The isotope composition of this varies across Britain and was first published by BGS staff in 2003.

The NIGL is an international centre for such studies and has played a major role in developing the techniques and databases that are now widely used.

If we look at Britain though history it is abundantly evident how mobile people were. Bronze Age burials from the Stonehenge area reveal that one individual, referred to as the Amesbury Archer, spent his childhood in Alpine Germany whereas another group, three young men found close to Stonehenge, could all be shown to have migrated, during their childhood, from somewhere founded on Palaeozoic rocks. The nearest place they could have spent their childhood was in Wales, but places on the continent cannot be ruled out. This shows that they moved at least 100 km to get from their homelands to Stonehenge.

Such diversity in populations is shown clearly in recent studies of Roman populations, but equally it is possible to define a combined isotope signature for populations living 'on the margin' in areas such as the Outer Hebrides. Archaeologists working in Dorset recently found a burial pit dating from just before

A burial pit found in Dorset, containing decapitated young men — possibly Viking invaders.

the Battle of Hastings. It contained the remains of young men who had been decapitated. Tooth enamel samples from some of the men were sent to the NIGL where we could show that the men spent their childhood in a region where the climate was much colder than Britain. The isotope data strongly supported the suggestion that these men were part of a Viking raid on southern Britain that was thwarted by the local residents.

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Stonehenge, site of several significant Bronze Age burials.

Recent articles in the newspapers highlight the forensic interest in using these techniques to study modern populations and specifically to try and identify the origin of immigrants into this country. What may seem like a straightforward transfer of techniques is, in fact, fraught with problems. Fingerprinting, using oxygen and strontium isotopes, depends upon the assumption that childhood diet was locally derived. We only have to look at a supermarket to realise that this is no longer the case. It has been used successfully in unusual cases such as 'Adam' the torso in the Thames. The Metropolitan police enlisted the help of isotope scientists to try and constrain the origins of this child whose body was found in 2000. The strontium isotopes showed he had an unusual signature that was not the 'averaged value' typical of the modern, western European diet and hence could not have been raised in Britain.

Isotope analysis facilities at NIGL.

Studies referred to in the text were done in collaboration with colleagues at the Universities of Bradford, Reading and London; Wessex Archaeology; Oxford Archaeology; CFA Archaeology and Dorset County Council.

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