

When skeletal remains require urgent identification, the ability to use the virtual services of experts at the end of an email can be extremely effective. **Lucina Hackman** and **Sue Black** explain more about bones@dundee.



Applying virtual ID

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Forensic anthropology is perhaps best defined as the analysis of the human, or what remains of the human, for medico-legal purposes. In the past it has primarily been associated with skeletal remains, but its core involvement in disaster victim identification (*Black et al., 2010*), age evaluation in the living (*Hackman et al., 2010*) and image comparisons of suspects versus offender (*Fresco, April 22, 2009*), has ensured that its profile has altered quite dramatically in recent years.

Within the UK, forensic anthropologists can be freelance, they may be embedded within a forensic service provider or, more likely, they are located within university departments. By far the most common request asked of any forensic anthropologist is to determine whether remains are human and how old they might be, or if animal, which species they represent (*Cattaneo, 2007, Ganswindt et al., 2003*). It is most likely that remains presented will not be human, or if they are, then frequently they are of archaeological origin. Very few inquiries are human and of forensic relevance, but the possibility that they might be poses a problem for investigative forces.

Analysis of non-human bone is potentially expensive both with regards to direct costs in relation to expert fees but also in the ancillary costs associated with maintaining security at a scene until a decision can be reached.

In 2008, in response to comments about this problem from

police officers being trained on the UK national Disaster Victim Identification (DVI) programmes, the Centre for Anatomy and Human Identification (CAHId) at the University of Dundee, instigated a mutually beneficial partnership that:

- a) allowed officers to obtain a rapid identification of the human or non-human origin of skeletal material; and
- b) provided anthropologists with regular tests of their bone identification capabilities through access to different animal species.

The intended purpose of the service was to provide a free, quick and reliable response to the most frequently asked question – ‘is it human?’ – and to provide the anthropologists with continued professional development opportunities. The service is referred to as VACS (Virtual Anthropology Consultancy Service) and this brief communication investigates how this facility has evolved over the two years in which it has been available to UK investigative forces. Over 90 per cent of all cases referred to VACS relate to animal and not human bone. The five on-call anthropologists work on a rotational basis and provide quality control through spot check assessments, challenging where uncertainties occur and providing back-up support and advice for difficult cases. This has become referred to by many forces as the ‘bones email’ service and it operates in the following manner:

■ A photograph is taken of the bone/bones with a scale and appropriate lighting either at the scene or at the police station if they have already been lifted, or brought in by a member of the public. The photograph must be in focus. Figure 1 (below) shows a good quality image where the lighting and the scale are appropriate.

■ The officer then attaches a JPEG image of the item to an email which contains their contact information. This is then sent to bones@dundee.ac.uk. It is helpful if a phone call is made to the administration office informing them that a case is due to arrive.



Figure 1: Ideal image of a bone – in this case the left femur from a sheep – with good lighting, background and scale.

■ The on-call anthropologist picks up the case and responds almost always within the hour. Over 95 per cent of cases are addressed within ten minutes of the email being received. Cases are also picked up in the evenings and at weekends as staff have electronic alert mechanisms, although response within the hour is not guaranteed in these circumstances. The service does not have 24-hour coverage, but queries are dealt with well into the evening.

■ The anthropologist then either phones or emails the force contact, with an instant opinion as to the nature of the material.

■ The anthropologist follows this up with a brief formal statement, supporting their initial assessment of the material presented. This provides a hard copy for force records.

■ In cases where an identification is not possible, or the remains are believed to be human, the on-call anthropologist will direct the force to their nearest local forensic anthropologist/relevant specialist with a suggestion that they should take the specimen to that individual for more detailed analysis.

A total of 189 cases have been addressed since the inception of the service – 26 cases in 2008, 80 in 2009 and 83 up to July of 2010. Thirty-three forces have both independently requested and used this service or have been directed to the service via the National Policing Improvement Agency (NPIA).

The images

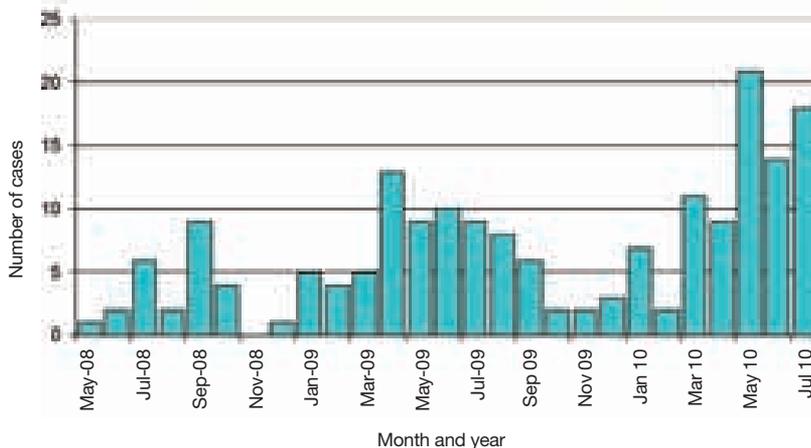
Bones are not always easy to photograph because of their shape and colouring. A simple, well-lit, focused photograph with a scale is all that is required to fulfil the preliminary assessment, although several views can be helpful as some surfaces are more characteristically identifiable than others (figure 1). If additional views are required then these will be requested with detailed instructions. Images are sometimes sent directly from mobile phones or iPhones, ensuring that a rapid response is possible, bringing the scene to the expert, which has significant positive benefits for time critical planning.

Police service IT firewalls do occasionally cause a problem and keeping attachment size down is also a consideration for some forces. Frequently, the resolution of the images exceeds what is necessary and this is what causes the problem with file size. It is possible to save the images into a word document and then convert them to a PDF and a number of times this has enabled previous difficulties to be overcome.

The most frequent users of the service are Kent Police (40 cases), the Metropolitan Police Service and Norfolk Constabulary (15 cases each) and Humberside Police (11 cases). In combination, these four forces account for nearly 50 per cent of all submissions to VACS in the last two years. Forces across England, Wales, Scotland and Northern Ireland have taken advantage of the service, and Kent Police has also utilised the service as part of its crime scene investigation (CSI) development course.

David Bellamy, the CSI training manager for Kent Police, explains how the service has helped crime scene investigation courses run by the force.

Table 1 – Number of bones cases from May 2008 to July 2010



As part of the two-week CSI development course, there is a group practical exercise to illustrate the methodology used in the forensic recovery of material within a shallow grave. Several months prior to the course, a number of items (including pig bones) are buried at various depths in a 'grave cut'.

"During the exercise we arrange for the students to use the system in place at Dundee University to identify any bones recovered. This real-time request demonstrates the ease and speed in which bones can be identified to assist in a criminal investigation," Mr Bellamy explained.

"All the staff at Dundee university have been exceedingly helpful in all our training exercises and this has contributed significantly to the learning outcomes for the students."

A recent review of the service was carried out through contact with all forces that have utilised the no-cost service in order to determine whether its continuation was deemed to be of value. No negative responses were received and it was clear that the service was viewed to be both valuable and effective by rapidly eliminating non-productive investigations at an early stage.

West Mercia Police has previously relied on local doctors, vets or, in one case, a butcher for a tentative identification.

"Unidentified bones are often discovered by builders, dog walkers and children, who then either bring their discover-

Table 2 – Number of cases by days of the week

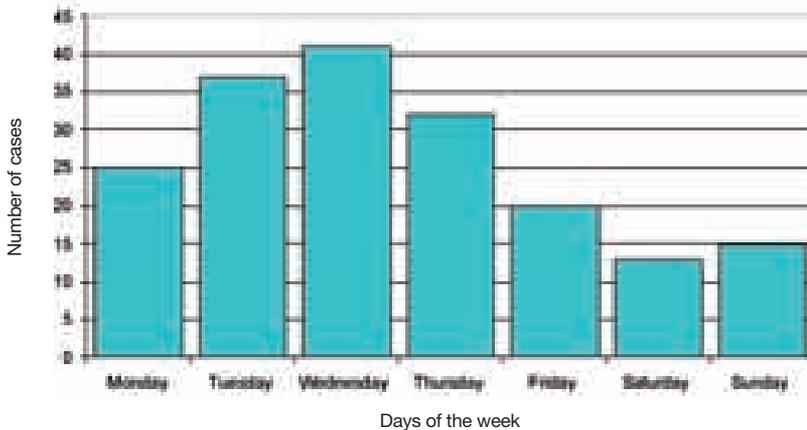
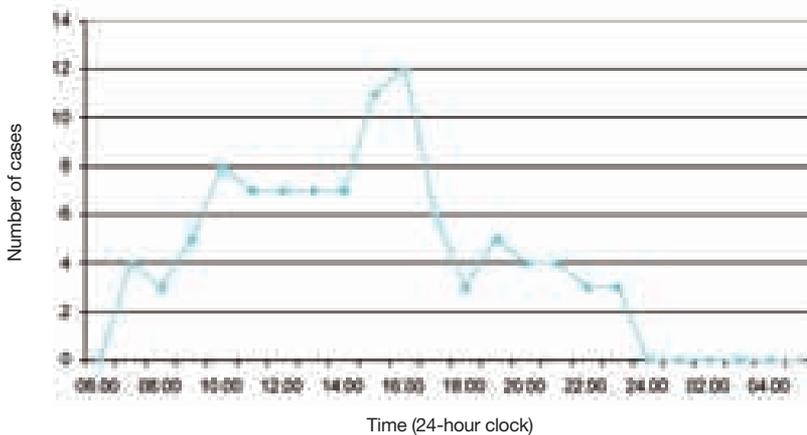


Table 3 – Time of day at which cases are sent



ies to the police station, usually wrapped in a carrier bag, or under the TV influence of programmes such as *Time Team* or *CSI*, leave their finds in situ for us to examine,” said Paul Beeton, the force’s head of scenes of crime.

“Having met Lucina Hackman on a body recovery course and talked about bones@dundee, I was determined to bring our practice into the 21st century. With our recent change-over to digital photography, we have been able to email images direct to Dundee for a professional identification.

“On the four occasions in the past 12 months that I have used the service, I have always been amazed by the speed of response. On the last occasion, Lucina rang me with identification within 20 minutes of me sending her the images. Only once has the bone been human and then Xanthe Mallet from the Dundee team was able to point me in the direction of other experts who could help with the radio carbon dating, etc.

“Without a doubt, this service has helped to speed up our inquiries and allow a more efficient use of police time.”

As the service has now been running for two years, it was felt there would be sufficient data to examine the calendar periodicity of submissions to establish whether there were particularly active periods throughout the year. An examination of submissions in relation to the month is presented in table 1 (on previous page).

As expected, the summer months were busier, with more cases coming in as people go out in their garden to dig and spend more time in the countryside with the nicer weather.

The initial high spikes for the year seem to coincide with the turn in weather around Easter, when the anthropologists were conscious of a more frequent opener to the emails that commenced with ‘whilst a gentleman was digging in his garden...’.

There is no solid basis for the assumption that the majority of finds made in the winter months are by the ubiquitous ‘dog walker’, but it seemed to be a relatively common preamble in the opening statements to many of these cases. Of interest is the large number of cases which are submitted during January, which has yet to be explained; perhaps there is more DIY ongoing at this time of year resulting in more bones found under floorboards, or perhaps more active outdoor pursuits to counteract the Christmas indulgences. It will be interesting to follow the trends over the next few years to see if these initial patterns are maintained.

The VACS email service is available throughout the week, giving evening and weekend cover which many forces have found useful since these out of hours finds can cause particular problems. Table 2 illustrates the number of cases submitted to the VACS email service by the days of the week. Interestingly, 15 per cent of cases are submitted during the weekend.

While the VACS email service is not available on a 24/7/365 basis, emails are picked up out of hours, including evenings and weekends. The anthropologists reported awareness that there seemed to be a large proportion of submissions outwith normal office working hours and table 3 illustrates the findings when the time of submission for each case was examined. Two peaks were identified – the first occurred in the late morning and the second, larger peak, occurred later in the afternoon, around 4pm. This second peak can cause problems as it often coincides with scenes of crime officers (SOCOs) or CSI officers finishing shift for the day and so direct contact is not always possible until the following day, which can negate one of the primary purposes of the service. Nearly 18 per cent of all submissions occur out of normal working hours.

What is also interesting to note is that no case has as yet been submitted between the hours of 11pm and 7am and the lows for the day are located at 8am and 6pm. A significant number of cases are submitted in the evening between 6pm and 11pm.

Conclusion

The free bones email service was set up in May 2008 in response to comments and requests from both police officers and CSIs and this brief overview marks the two-year point since inception.

As can be seen from the numbers in table 1 (on previous page), the service is receiving an increasing level of traffic, but it appears that it is meeting the expectations and requirements of its end users. Forces find it a quick, simple and cost-effective means to get a response to the ‘is it human?’ question. A quick and accurate response ensures that officers are not unduly detained from other duties. On many occasions this has meant that the cordon placed around the find can be taken down within the hour, saving time and money for the forces involved.

It is the intention that this service will continue to be provided by the University of Dundee and that regular analysis of patterns will be undertaken to ensure that end-user requirements are being met.