Scavenging in Northwestern Europe: a survey of U.K. police specialist search officers

Alexandria Young,[1] Ph.D.; Richard Stillman,[1] Ph.D.; Martin J. Smith,[1] Ph.D.; Amanda H. Korstjens,[1] Ph.D.

[1]School of Applied Sciences, Bournemouth University, BH12 5BB

Corresponding Author:

Alexandria Young, Ph.D.

Bournemouth University,
School of Applied Sciences
Christchurch House
Fern Barrow
Bournemouth
Poole
Dorset BH12 5BB
email: younga@bournemouth.ac.uk

work: 01202 524111

ABSTRACT

Physical search methods used by police specialist searchers are based on counter-terrorism methods and not on the search and recovery of outdoor surface deposited human remains, nevertheless these methods are applied to scenes involving human remains. Additionally, there is limited published forensic literature within Northwestern Europe on the potential taphonomic agents within this region that are capable of modifying human remains through scavenging, scattering and removal. The counter-terrorism basis in physical search methods and the gap in published forensic literature regarding scavenging in this region can potentially impede searchers' abilities to adapt physical search methods to their full efficiency in the search and recovery of scavenged human remains. This paper analysed through a questionnaire survey of 111 police specialist searchers, within the U.K., the impact of animal scavenging on the search and recovery of human remains. According to questionnaire respondents' experiences and knowledge, the occurrence of scavenging at scenes in which respondents took part in a physical search for human remains was common (63.46%, *n*= 66) and happened most frequently with surface deposits (68.25%, *n*= 43). Scavenging resulted in the recovery of incomplete sets of remains (59.79%, *n*= 58) and influenced search perimeters (58.33%, *n*= 35). Scavenging also affected recovery rates at scene searches (80.43%, *n*= 74) that included the use of cadaver dogs with police handlers. The impact scavengers within this region have on different crime scene scenarios and search methods is not reflected in current published literature or search standards.

Keywords: crime scene investigation, forensic archaeology, scavenging, search, police

Introduction

There is currently a gap in scavenging studies and published forensic case studies within Northwestern Europe, nevertheless there are scavenger species within this region capable of modifying human remains. Wild scavengers to be found within this region include rodent, avian, canid and mustelid species (Kruuk and Parish, 1981; Doncaster *et al*., 1990; Corbet and Harris, 1991; Da Silva *et al*., 1993; Alderton, 1994; Todd *et al*., 2000; Reif *et al*. 2001; Revilla and Palomares, 2001, 2002; Macdonald *et al*., 1996, 2004; Sterry, 2005). More specifically within the U.K., common wild scavengers include wood mouse (*Apodemus sylvaticus*), grey squirrel (*Sciurus carolinensis*), carrion crow (*Corvus corone*), buzzard (*Buteo buteo*), Eurasian badger (*Meles meles*), and red fox (*Vulpes vulpes*) (Young *et al*., 2014a, 2014b). All of these scavengers are capable of causing significant soft tissue damage to surface deposited human remains (Mann *et al*., 1990; Haglund, 1992; Rothschild and Schneider, 1997; Byard *et al*., 2002; Asamura *et al*., 2004; Morton and Lord, 2006; Klippel and Synstelien, 2007; O'Brien *et al*., 2007). However, the bite force, jaw strength and body size of foxes and badgers enable them to not only scavenge human remains but also disarticulate and remove skeletal elements from deposit sites (Schmitz and Lavigne, 1987; Corbet and Harris, 1991; Alderton, 1994; Baryshnikov *et al*., 2003; Lee and Mill, 2004; Christiansen and Adolfssen, 2005; Sterry, 2005; Wroe *et al*., 2005; Christiansen and Wroe, 2007). Moreover, the dentition and jaw strength of foxes and badgers are capable of fracturing and modifying bone surfaces which can obscure sites of ante- and peri-mortem trauma (Schmitz and Lavigne, 1987; Corbet and Harris, 1991; Alderton, 1994; Baryshnikov *et al*., 2003; Lee and Mill, 2004; Christiansen and Adolfssen, 2005; Sterry, 2005; Wroe *et al*., 2005; Christiansen and Wroe, 2007; Hillson, 2005).

Despite the ability of British avian and mammalian scavengers to scavenge, remove and scatter human remains, information pertaining to scavenging within this region is often based on anecdotal evidence disseminated amongst forensic professionals. Moreover, there is currently no search protocol or formal procedure for conducting searches of human remains or deposit sites that have been modified by animal scavengers (NCPE, 2005, 2006).

Procedures regarding the search for human remains fall under those of homicide investigation and tend to be based on behavioural, topographical, and geographical analyses, as well as intelligence, related to the crime scene scenario, victim, location, and offender (Harrison and Donnelly, 2008). The procedures for homicide investigations do not take into account the impact that scavenging can have on human remains and deposit sites, and, in turn, search methods.

Individuals involved in a physical search at a crime scene can include untrained non-specialist searchers or specialist searchers which are either accredited or licenced by the Association of Chief Police Officers (ACPO) or trained by the National Centre for Policing Excellence (NCPE) (NCPE, 2006). Trained and licenced specialist searchers include police search advisers (PolSAs), police search team members, and police search coordinators whose training is focused on using counter-terrorism (CT) search methods for the recovery of evidence related to firearms and explosives, as well as smaller evidence related to forensic examination (e.g. blood, mobile phones) (NCPE, 2005, 2006). CT search methods are not based on the search for human remains but are still used and promoted as fully transferrable systematic techniques that can be applied to a variety of scene scenarios. To date, the effectiveness of current search methods used by police search officers in the search for scavenged and scattered human remains has not been assessed. Additionally, police search officers' experiences with scavenging have yet to be quantified. This paper seeks to further highlight the incongruity between the amount of literature on scavenging activities within Northwestern Europe, especially within the U.K., and the impact of scavenging on forensic investigations and physical searches of scenes involving scavenged human remains.

Materials and Methods

Over the course of 164 days, an online survey was made available to police search officers within the U.K. through the National Police Improvement Agency (NPIA) and seminars presented by the researcher to police officers. All information provided by

participants was anonymous. A total of 21 open- and closed-ended questions were provided so as to quantify police search officers' different experiences with scavenging (Table 1). The first question and questions 11 to13 then 18 to 20 were open-ended questions. Closed-ended questions include questions two to 10 and questions 14 to 17. The survey asked a variety of questions pertaining to police search officers' experiences and knowledge of forensic cases over their career span in which scavenging of human remains occurred. Police search officers' knowledge of the extent to which scavengers modified human remains and affected the recovery of skeletal elements were examined. The survey aimed to assess the occurrence of scavenging, scavenger species, and the general effects of scavenging on the recovery of skeletal remains within the U.K., as per police search officers' knowledge.

Results

A total of 111 individuals participated in the survey. Participants identified their professions as police officer (*n*= 74), police search adviser (PolSA) (*n*= 28), police dog handler (*n*= 7), crime scene manager (*n*= 1), and police technical search assistant (*n*= 1). Of these respondents, five identified themselves as both a police officer and PolSA. However, the general term police officer does describe all of these professions so there is some ambiguity as to how officers participating in the survey labelled their profession because the question was provided as open-ended. More than 81% of participants had over 10 years of professional experience (*n*= 92) and none had less than five years.

One hundred and four responses to questions three and four showed that 63.46% (*n*= 66) had either attended a scene or knew of scenes where animal scavengers affected human remains and, more specifically, skeletal remains (57.69%, *n*= 60). For question five, 89.69% (*n*= 87) of 97 respondents had taken part in a crime scene search involving human remains. Ninety-seven answers to question six indicated that 59.79% (*n*= 58) of participants had been part of a crime scene search in which all of a set of human remains was not recovered. 74% (*n*= 72) of ninety-seven respondents to question seven had been part of a

scene search which employed the use of cadaver dogs. Seventy-four (80.43%) of ninety-two responses to question eight showed that despite the use of cadaver dogs respondents had taken part in a scene search in which a whole set of human remains was not recovered. Similar to question nine, 25% (*n*= 69) of responses indicated that when cadaver dogs were used, search methods and results were affected by scavenging.

When answering questions 10 – 19 participants were instructed to base their answers on their own experience of forensic cases involving scavenging. 53% (*n*= 48) of 90 respondents to question 10 had been part of a search in which human remains and/or search were affected by scavenging. Questions 11-13 were open-ended questions thus it was possible for respondents give multiple answers. Questions 11 and 12 asked participants how scavenging affected human remains and search efforts. According to question 11, the majority of police search officers' experiences (58.33%, *n*= 35) with scavenging resulted in the search area being increased due to the scattering of skeletal remains. Question 12 highlighted that scavengers affected human remains by not only scattering elements (25%, *n*= 15) but also through soft tissue and bone modification (e.g. bite marks) (41.67%, *n*= 25).

Sixty-three responses to question 13 showed that the majority of remains were surface deposited prior to scavenging (Figure 1). As participants' responses for open-ended questions, such as question 13, were not restricted, some responses were given as "N/A" and with no further information by respondents. Thus, "N/A" responses for open-ended questions may mean that the respondent did not have experiences with scavenging and did not feel that the question was applicable to their experiences. 57% (*n*= 35) of 61 answers to question 14 confirmed that human remains were disarticulated and/or removed from deposit sites by scavengers. Interestingly questions 15 and 16 indicated that scavenged human remains were more commonly deposited as a whole body (Yes: 75.41%, *n*= 46) rather than as dismembered (Yes: 18.03%, *n*= 11) prior to scavenging.

Questions 17 – 19 focused on the identification of scavenger species. Questions 18 and 19 were open-ended questions so multiple answers could be given by each respondent if they felt it was necessary. Sixty-one responses were received for question 17, of which

66% (*n*= 40) indicated that scavenger species were identified within the crime scene area. Answers for question 18 varied from fox, badger, unknown, rodent, aquatic, avian, dog, rabbit, and not applicable (Figure 2). Fifty-nine responses to question 19 indicated that scavengers were identified by methods which were both varied and subjective (Figure 3). The majority of scavengers were identified based on the proximity of remains to badger setts, fox dens and rabbit warrens (16.95%, *n*= 10). Interestingly, 15.25% (*n*= 9) of responses stated that scavengers were not identified.

Question 20 ascertained participants' opinions on the provision of species-typical scavenging knowledge to forensic investigations and physical searches of scenes. 93.33% (*n*= 56) of respondents to question 20 felt that the provision of additional species-typical scavenging information would be beneficial. Question 21 was an additional section of the survey for any comments from participants. Eight additional comments were provided by respondents and ranged from interest in the subject of scavenging and requests for further correspondence.

Discussion

This survey is the first time that police search officers' experiences with cases involving scavenging within the U.K. have been assessed. The survey has shown that police search officers are indeed faced with scenes within the U.K. involving the scavenging of human remains. Additionally, the survey has shown that scavengers of this region can affect police search officers' search and recovery efforts of scavenged human remains. Police search officers aim to recover as many skeletal elements of a set of remains for identifications and interpretations related to the individual and investigation, as well as out of respect for the individual's family. Search methods will thus need to be adapted according to factors which affect the crime scene scenario, such as scavenging, so that the highest possible recovery rate of elements is achieved. The gap in published forensic literature and knowledge of scavenger species-typical scavenging behaviour and pattern within this region

restricts police search officers' ability to adapt search methods for the optimal recovery of scavenged remains.

In the construction and execution of a search strategy, the senior investigating officer (SIO) must identify the search objectives and priorities, search perimeters, required resources, and search methods (NCPE, 2006). The SIO will consult and work with PolSAs regarding the appropriate search methods depending on the scene, objectives, and perimeters (NCPE, 2006). However, the current search protocols do not train or advise PolSAs and other specialist searchers in the search for scavenged and scattered human remains. Current search methods, based on counter-terrorism and not human remains, used by specialist searchers and the search strategy implemented by SIOs need to be adapted for the more effective and efficient search for human remains and deposit sites that have been modified by scavengers.

The questionnaire showed that scavenging activities can affect the search and recovery efforts of specialist searchers, with or without the aid of cadaver dogs, and result in the recovery of incomplete sets of human remains. The use of cadaver or victim recovery dogs to assist police search officers in the search for human remains is common practice (Komar, 1999; Brown *et al*., 2002; Blau, 2004; Rooney *et al*., 2004; Oesterhelweg *et al*., 2008). When dogs are employed in the search for human remains they are led by their handlers in a systematic search method through the scene (Komar, 1999; Brown *et al*., 2002; Blau, 2004; Rooney *et al*., 2004; Oesterhelweg *et al*., 2008). Handlers knowledgeable of scavenger species-typical scavenging behaviour and patterns would be at an advantage by focusing their dog's search efforts within the scene to reference points associated with scavengers.

According to the survey, police search officers' experiences with scavenged human remains occurred more frequently with surface deposits and human remains deposited as whole rather than buried and dismembered remains. Respondents may have had more experiences with such remains because whole remains would be expected to have greater chances of being recovered than those deposited as dismembered because the lesser

weight of dismembered elements would allow scavengers of certain sizes to remove elements (Morton and Lord 2006; Clark *et al*., 1997; Komar, 1998). Dismembered remains or those deposited with trauma expose soft tissue to weather conditions and insect activity which can increase the rate of decomposition of the remains (Bass, 1997; Benecke, 1998; Campobasso *et al*., 2001; Kulshrestha and Satpathy, 2001; Pohjoismäki *et al*., 2010). An increased rate of decomposition can contribute to easier disarticulation and removal of elements by different scavenger species (Morton and Lord 2006; Clark *et al*., 1997; Komar, 1998). There is also the possibility that remains recovered and interpreted as surface deposits may have been initially deposited as shallow burials accessed by scavengers. Interestingly, current search protocols refer only to the search of homicide burials and not to homicide surface remains (NCPE, 2005, 2006). This is possibly again due to the assumption of fully transferable CT search methods to surface deposited human remains. It is evident in the questionnaire that investigations do include surface deposits, thus whether or not human remains are scavenged current search protocols need to be reassessed for the adaption of search methods for surface remains.

Despite scavengers' abilities to greatly modify human remains and affect search and recovery efforts, the survey suggests that SIOs and police search officers are not incorporating the identification of scavenger species into the majority of investigations. Currently, the identification and interpretation of scavengers may not be included in investigations and search strategies because of the gap in the literature and knowledge in this region of the effects of scavengers on human remains. Alternatively, SIOs that are including scavenging are potentially limited by the following: absence of search protocol or procedures for searching for scavenged human remains; time and financial constraints; scientific support managers' (SSM) being unaware of available resources or experts on scavenging; and limited numbers of available PolSAs or specialist searchers.

The scavengers most frequently interpreted as the agents altering remains within the police search officers' experiences in this study were foxes and badgers. However, where scavenger species had been interpreted the methods employed appear to have been varied

and subjective, thus leading to possible incorrect identifications and interpretations associated with the scavenger and human remains (e.g. trauma) (Byard *et al*., 2002; Ropohl *et al*., 1995). For example, Young *et al*. (2014b) presented five forensic cases of scavenged human remains surface deposited within Britain. Within the cases, the identification of scavenger species was based on the presence of typical carnivore damage to bone surfaces (e.g. epiphyseal ends; bite marks). This method of identification is subjective and does not include quantitative methods of analyses for more accurate identifications of scavenger species, taxon, or size, which could indicate specific areas associated with a scavenger to be searched within a scene or the need to extend the scene parameter to maximise the recovery of human remains. The use of subjective, varied, anecdotal and potentially incorrect identification of scavengers can give rise to the dissemination of incorrect knowledge of scavenger species-typical scavenging behaviour and poor adaptation of search methods. The use of an objective and standard identification method, like bite mark dimensional data, along with accurate knowledge of different scavengers' species-typical scavenging behaviour, can indicate key reference points to be searched within and surrounding a scene, as well as guide adaptations to search and recovery methods. Thus, police search officers are also at a disadvantage in the search, recovery, and interpretation of scavenged human remains by not pursuing the identification of scavenger species.

Conclusion

This paper demonstrates that the scavenging of outdoor deposited human remains is common within the U.K. and does affect police specialist searchers' search and recovery efforts. Scavenging activities within this region were capable of impeding the complete recovery of sets of human remains, despite the assistance of cadaver dogs. Scavenger species within this region are capable of modifying human remains through scavenging, disarticulation, scattering, and removal from deposit sites. Closing the gap in the knowledge of scavenger species and their species-typical scavenging behaviour and patterns within this region and incorporating such knowledge into the physical search methods used by

searchers can potentially enable the more efficient and effective search and recovery of human remains.

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List of Figures and Tables

question 19.

Table 1. The 21 questions provided via an online survey to police search officers and the various answer formats for each question.