



# The utilisation of carnivore scavenging evidence in the interpretation of a protohistoric French pit burial



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## ARTICLE INFO

### Article history:

Received 20 March 2014

Received in revised form

1 August 2014

Accepted 11 August 2014

Available online 23 August 2014

### Keywords:

Scavenging

La Tène

Action burial

Excarnation

MSCT

ESEM

## ABSTRACT

Scavenging is one of the main taphonomic changes that bone assemblages undergo. This paper presents specific taphonomic data on bone modification by canids from the French archaeological site of Duisans 'La Sèche-Epée,' dating from the 'La Tène A' period (500–400 BC). Anthropological description and analysis of two incomplete male skeletons found in a pit allows us to document the postmortem alteration of bodies by canid scavengers and poses several questions about the nature of the deposit. The morphology of these marks, which are sometimes similar to antemortem lesions, and the disarticulation and dispersal of anatomical parts are crucial elements that need to be accurately described and accounted for in archaeological or forensic contexts. The evidence of violent death and the secondary treatment of the cadavers can be interpreted as either an opportunistic votive burial, an actual sacrifice with a specific ritual pattern, or more traditionally, a deviant deposit in which the individuals were deprived of funerals and exposed to scavengers.

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## 1. Introduction

Carnivore scavenging is one of the postmortem taphonomic changes traditionally documented for human remains in forensic outdoor contexts (e.g., Haglund et al., 1988, 1989, 1993; Haglund, 1997a, b; Moraitis and Spiliopoulou, 2010) and archaeological contexts (e.g. Bindford, 1981; Brown et al., 2006; Haynes, 1980, 1982; Hill, 1979; Saladié et al., 2011; Selvaggio and Wilder, 2001). Scavenging includes the actions of all types of animals (terrestrial, avian and marine) on human and non-human remains that are left exposed either on the ground, in shallow graves or in marine environments (Sorg et al., 1997). Scavengers feed on any accessible carcasses, causing observable patterns of changes to the bones and specific distribution and dispersion of the remains.

According to their species and their dental anatomy, scavengers leave characteristic marks on the osseous remains (Dominguez-Solera and Dominguez-Rodrigo, 2009; Fisher, 1995; Haglund et al., 1988, 1989, 1997a, b; Knight, 1991; Lotan, 2000; Milner and Smith, 1989; Patel, 1994; Saladié et al., 2011; Willey and Lynn, 1989).

Canids and especially dogs, for example, generally leave impressions or marks on bones, which have been identified and well defined by Haynes, Binford and Haglund (Bindford, 1981; Haglund, 1997a, b; Haynes, 1980). They are described as punctures and perforations (on flat bones and trabecular ends of long bones), pits (depressions into the cortical surface), furrows (longitudinal channels) and scoring (transverse scratches on long bone diaphyses). However, almost all carnivores may become scavengers depending on their circumstances and particularly in response to undernourishment stress (Brown et al., 2006).

Scavenging has several consequences in both bioarchaeology and forensic anthropology. In a forensic context, scavenging may leave postmortem alterations on bones that can be confused with antemortem lesions or cause simulation of antemortem wounds, destruction of key identification features and disorganisation of crime scenes (e.g., Moraitis and Spiliopoulou, 2010; Tsokos et al., 2010). In an archaeological context, scavenging may decrease the bone preservation and representation or combine various archaeological bone assemblages, due to extensive lesions and progressive body disarticulation (e.g., DeVault et al., 2003; Dominguez-Rodrigo, 2001; Haglund and Sorg, 2002; Hill, 1979).

We studied the skeletal remains of two individuals and some bovid bones buried in a pit. They came from the archaeological site of Duisans 'La Sèche-Epée' (Pas-de-Calais, France), dated from the 'La Tène A' period (500–400 BC).

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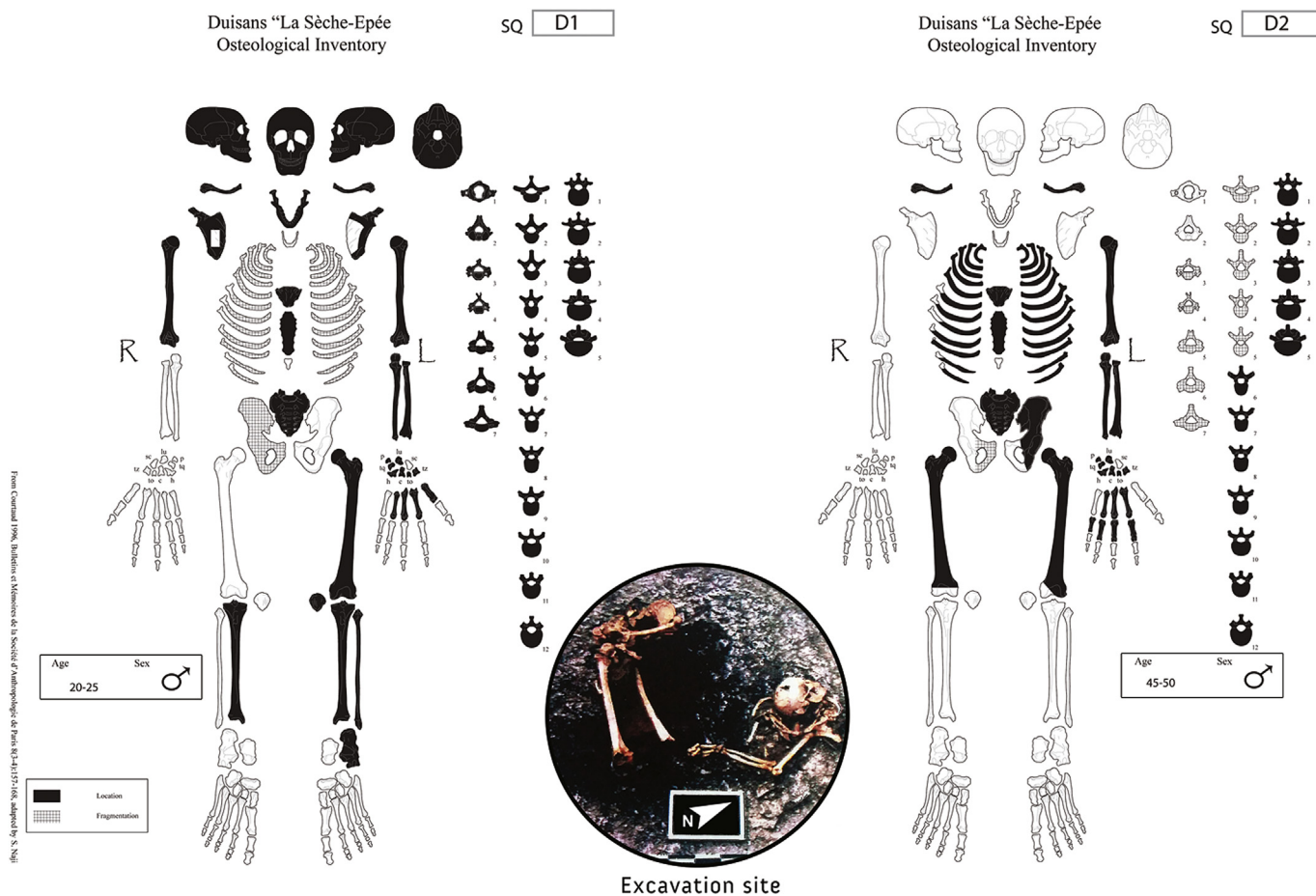


Fig. 1. Distribution of bones (in black) for D1 (left) and D2 (right). The inset shows a superior view of the pit.

Pit burials are part of a diverse set of Latenian funeral or mortuary practices documented in northern France, as well as in Britain (e.g., Carr and Knüsel, 1997; Wilson, 1981; Cunliffe, 1992; Debiak et al., 1998; Delattre et al., 2000; Fitzpatrick, 2010; Hill, 1995; Marion et al., 2010; Landolt et al., 2010; Madgwick, 2008). Outside cemeteries and isolated burials, human remains with or without animal bones were frequently deposited in pits. This sort of mortuary practice raises many questions: did pit burials have specific organisational rules, were they linked to ritual performances or were they used as abandoned places for relegation burials?

In this paper, we highlighted the utilisation of carnivore scavenging evidence found on both human and animal bones to refine the interpretation of this protohistoric French pit burial.

## 2. Materials and methods

### 2.1. Archaeological context

The site of Duisans ‘La Seche-Epée’ is located near Arras in the Scarpe Valley (northern France) and was excavated in 1996 by Alain Jacques. The site is composed of two pits on both sides of a trail dating from the Early Tène period, approximately 500 BC (Debiak et al., 1998). These pits were originally used for storage and later transformed into refuse dumps (Villes, 1987). The largest pit is 2.9 m in diameter and 1 m in depth, with an estimated volume of 6 m<sup>3</sup>. It contained the skeletal remains of two individuals, D1 and D2, and fragmented remains of bovid bones.

Both human skeletons were incomplete and partially disarticulated. D1 was found lying face down at the bottom of the silo, with its cranium and mandible visible on its right side. Four vertebrae, the mandible and parts of the limbs were still articulated. D2 was found on its back, with the right femur connected to the pelvis (Fig. 1). All human and bovid bones presented periosteal polish and snake-like erosions caused by root etching (Quatrehomme and Iscan, 1997) (Fig. 2).

We used three indexes to document the state of preservation of those bones: the anatomic preservation index (API); the bone representation index (BRI); and the qualitative bone index (QBI), according to Bello et al. (2006). Outdoor postmortem exposition time was estimated using a model for stages of canid-scavenged disarticulation (Haglund, 1997a; Haynes, 1980, 1982; Hill, 1979). This method consists of evaluating the condition of the remains to estimate the postmortem interval in which canids could have access to the body.

### 2.2. 3D MSCT analysis

Multi-slice computed tomography (MSCT) acquisitions were performed using a Siemens Somatom Sensation 64 scanner and an Advantage Window Station (General Electric®), in the Musculoskeletal Radiology Department (Lille University Hospital). Scanning settings were as follows: slice thickness 0.6 mm, 120 Kv, 100 mA. Multiplanar reconstruction (MPR) and three-dimensional (3D) volume rendered analyses were performed using Osirix Imaging Software and 3D slicer (Open source DICOM Viewers). 3D surface

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