



Gendered Differences in Accidental Trauma to Upper and Lower Limb Bones at Aquincum, Roman Hungary



Rebecca J. Gilmour^{a,*}, Rebecca Gowland^a, Charlotte Roberts^a, Zsolt Bernert^b, Katalin Klára Kiss^c, Gabor Lassányi^d

^a Department of Archaeology, Durham University, Durham, DH1 3LE, UK

^b Department of Anthropology, Hungarian Natural History Museum, 1083 Budapest, Hungary

^c Department of Radiology, Semmelweis University Hospital, 1083 Budapest, Hungary

^d Aquincum Museum, 1031 Budapest, Hungary

ARTICLE INFO

Article history:

Received 23 June 2015

Received in revised form 30 August 2015

Accepted 31 August 2015

Keywords:

Long bone trauma
Fracture treatment
Underfoot accident
Injury risk
Pannonia

ABSTRACT

It was hypothesized that men and women living in the border provinces of the Roman Empire may have encountered different risks associated with their different occupations and activities. Limb bone trauma data were used to assess sex-based differences in physical hazards and evidence for fracture healing and treatment. Two hundred and ten skeletons were examined from a late 1st to early 4th century AD cemetery at *Aquincum* (Budapest, Hungary). Upper and lower limb bone fracture types, frequencies, distributions, and associated complications were recorded, and gendered patterns in injury risks were explored. Of the 23 fractures identified, both sexes had injuries indicative of falls; males exhibited the only injuries suggestive of higher-energy and more direct forces. Most fractures were well-healed with few complications. The extremity trauma at *Aquincum* suggests that people buried here experienced less hazardous physical activities than at other Roman provincial sites. The patterns of trauma indicate the occurrence of “traditional” gender roles, whereby male civilians participated in more physically dangerous activities than females. Additionally, treatment may have been equally accessible to men and women, but certain fracture types proved more challenging to reduce using the techniques available.

© 2015 Elsevier Inc. All rights reserved.

1. Introduction

The border provinces of the northern Roman Empire were diversely populated by indigenous people, soldiers' families, veterans, and crafts specialists (Allason-Jones, 1999; Snape 1989; Whittaker, 1994). Civilians living in provincial communities normally participated in a wide variety of industrial, commercial, and agricultural activities to provide food, goods, and other services essential to support the Roman Empire and its armies (Elton, 1996; Hajnalová and Rajtár, 2009; Whittaker, 1994). Despite their important role in provincial society, the daily experiences of men, and especially women, in the Roman provinces are unclear. In order to better understand how risks and physical hazards differed between the sexes in these regions, this study examines the types and distribution patterns of fractures to the upper and lower limb bones (i.e., clavicle, humerus, radius, ulna, femur, tibia, fibula) in adult

skeletons from the civilian town of *Aquincum* (Budapest, Hungary), a capital city in the Roman province of *Pannonia*. By exploring fracture causes and evidence for good or poor healing, the upper and lower limb bone trauma at *Aquincum* may provide insight into the existence of gendered activities and differential access to treatment at the margins of the Roman world.

Fractures are partial or complete breaks to bone, caused by an acute traumatic event, repeated stress/strain over time, or are secondary to an underlying pathological or “insufficiency” condition such as osteoporosis (Hamblen et al., 2007; Peris, 2003). Bone will break according to recognizable patterns that can be used to interpret the causative mechanism (e.g., direct or indirect trauma, intermittent stress) and forces applied to a bone (e.g., tension, compression, torsion, flexion, shearing) (Alms, 1961; Egol et al., 2010; Galloway et al., 2014a; Hamblen et al., 2007). When contextualized with available archaeological and historical information, interpretations of fracture forces and mechanisms can potentially provide insight into the types of hazards that caused fractures in the past.

The degree to which a provincial citizen was at risk for injury likely varied according to their occupation and day to day activi-

* Corresponding author. Department of Anthropology, McMaster University, Chester New Hall 524, 1280 Main St. West, Hamilton, Ontario L8S 4L8, Canada.
E-mail address: gilmourj@mcmaster.ca (R.J. Gilmour).

ties, both of which were influenced by their status, age, and gender (Allison, 2007; Redfern and DeWitte, 2011b). In this study, the term “gender” refers to an individual’s social identity, while “sex” refers to sexually dimorphic features in male and female skeletons (Hollimon 2011; Walker and Cook 1998). Palaeopathological data may be used to infer gendered activities through the identification of differences in the patterns and prevalence of skeletal lesions between biologically sexed male and female skeletons (Hollimon, 2011; Sofaer, 2006; Walker and Cook, 1998).

Accidents related to mobility and loss of balance are clinically called “underfoot accidents” (Davies et al., 2003; Manning, 1983). Underfoot accidents can affect both sexes, but the lower bone mass and muscle strength exhibited by many post-menopausal women can increase their risk for injury in comparison to men (Davies et al., 2003; Manning, 1983). Underfoot injuries include falls caused by *trips*, which occur when a swinging leg is abruptly interrupted upon impact with an object or body part, and *slips*, which are the loss of heel friction and “skidding” of the supporting leg(s) (Davies et al., 2003; Manning, 1983; Redfern et al., 2001; Zecevic et al., 2006). Falls (both slips and trips) commonly cause fractures to bones of the wrist when an individual tries to break their impact with an outstretched hand (Nevitt and Cummings, 1993; Verma et al., 2008). Another type of underfoot injury, regularly caused by ankle instability on uneven surfaces, results in oblique or avulsion fractures to the distal part of the tibia or fibula due to abrupt over-pronation or supination of the foot at the ankle joint (Cooper, 2000; Court-Brown et al., 1998; Donatto, 2001; Manning, 1983). These types of fractures have been previously observed in other Roman provincial contexts (e.g., Croatia: Novak and Šlaus, 2010, and Britain: Redfern, 2003), and are expected to be present at most sites in the Roman world.

Aside from everyday mobility hazards, men in the Roman period may also have been involved in dangerous military, agricultural, animal husbandry, and construction related activities (Erdkamp, 1999; Giardina, 1993b; Redfern and DeWitte, 2011b). The documented female occupations were comparably less physically demanding, but women were by no means relegated to domestic roles (Allison, 2007; Scheidel, 1995). In the public sphere, women worked in shops, food establishments, crafts and trades, some of which may have been more physically challenging (e.g., brick makers, olive pickers) than others (e.g., midwives, scribes) (Allison, 2007; Flemming, 2013; Gardner, 1986; Giardina, 1993b). Extremity fractures that are indicative of greater forces or higher energy mechanisms include oblique and spiral fractures that are often related to falls or jumps from a height (Johner et al., 2000; Petaros et al., 2013; Smith et al., 2006), as well as transverse fractures, associated with direct blows from other people (interpersonal violence), accidents involving animals, or damage from the use of tools (e.g., mallets, spades, and hoes), equipment (e.g., carts, ploughs), and construction materials (e.g., heavy wooden beams or stones) (Sölveborn, 2007).

In addition to injury hazards in antiquity, there were also risks associated with fracture healing. The healing potential of a fracture is influenced by: the type of bone fractured, the mechanical stabilization applied (“splinting”), if any, as well as an individual’s age and general health. Today, effective fracture healing is influenced by a person’s diet, medications, activity level, co-morbidities, access to treatment, as well as nutritional and metabolic deficiencies (e.g., vitamin D deficiency) (Gaston and Simpson, 2007; Mirhadi et al., 2013). People in antiquity were aware of techniques for non-surgical realignment (reduction) and stabilization of fractured bones using splints and poultices (Brorson, 2009; Celsus, 1961; Hippocrates, 2004; Redfern, 2010). However, the application of these treatments may not always have been universal, or indeed successful due to incompetence on the part of the person treating the patient or in the method used, or personal non-compliance

i.e., failure to follow instructions from the practitioner (Redfern, 2010). Fracture complications, including infection, osteoarthritis, and mal- and non-union, may also provide insight into fracture severity and possible treatment interventions, and yield information about provision of treatment and living conditions in the past (Dellinger et al., 1988; Grauer and Roberts, 1996; Karladani et al., 2001). Infection can be a complication of compound fractures, when broken bone ends pierce the skin and enable bacteria to enter the wound and subsequently the fractured bone (Dellinger et al., 1988); this non-specific infection can cause recognizable bony reactions, including periosteal new bone and osteomyelitis (Ortner, 2003). Osteoarthritis (OA) may develop following trauma, particularly in the case of poorly aligned fractures and injuries involving joints (Anderson et al., 2011; Rogers and Waldron, 1995). Imperfectly aligned, or mal-united, fractured bone segments occur as a result of poorly reduced and stabilized fractures (Hamblen et al., 2007), or movement of the limb before healing occurred. Fracture fragments can also sometimes fail to join (non-union fractures), resulting in sealed medullary cavities with dense sclerotic bone (McKee, 2000). Well-healed fractures, the most frequently recognized injuries in archaeological contexts, would of course not need stabilization at death. As such, appliances used for treatment, for example splints, would not need to be buried with the deceased, and have been found very rarely in the archaeological record (Roberts, 1988b). If they were, it is unlikely that they would preserve archaeologically due to the biodegradable nature of most Roman medical interventions, including splints, poultices, and bandages made from organic materials such as wood, wool, oil, and fabric (Hippocrates, 2004; Redfern, 2010; Roberts, 1988b).

To evaluate physical risks to Roman civilian health, this study uses fracture data generated from upper and lower limb bones from Graphisoft, the site of a 1st to 4th century cemetery associated with the *Aquincum* civilian settlement. It is hypothesized that males in this Roman border community encountered greater hazards in their lives than the females. If this hypothesis is supported, this would be in agreement with other provincial Roman studies that have found males to be at greater risk for mortality, possibly due to differences in ‘environmental stressors associated with employment’ (Redfern and Dewitte, 2011a; Redfern and DeWitte, 2011b, p.203). *Aquincum* males were expected to have a higher overall fracture prevalence and demonstrate injury types that are associated with strenuous activities. While it was expected that fractures would mirror a traditional, or “safe” model of gendered activities e.g., men are soldiers, women are weavers (terminology after Casella 2006), it was anticipated that both sexes would have fractures suggestive of underfoot accidents, reflective of daily life in a Roman city. Furthermore, the presence of mal-united fractures at *Aquincum* would provide evidence for ineffective fracture care, and suggest possible limits for the population to access or adhere to successful injury treatments at this civilian location. This study’s investigation of sex differences in limb bone trauma provides insight into the injury risks encountered by women and men and contributes to our understanding of gendered roles/activities in border cities of the Roman Empire. The presence and distribution of injury complications between the sexes may also potentially provide information about gendered barriers to healthcare in provincial Roman, urban centers.

2. Material and methods

Located in the northeastern corner of the Roman province of *Pannonia*, modern Budapest, Hungary (Fig. 1), the settlement at *Aquincum* included a legionary fortress with an associated military town (*canabae*), and a second, civilian, town (*municipium*, later *colonia*) two kilometers north of the legionary fort (Hajnóczy et al., 1995;

Download English Version:

<https://daneshyari.com/en/article/6554841>

Download Persian Version:

<https://daneshyari.com/article/6554841>

[Daneshyari.com](https://daneshyari.com)