International Journal of Osteoarchaeology
Int. J. Osteoarchaeol. **16**: 145–155 (2006)
Published online in Wiley InterScience
(www.interscience.wiley.com). DOI: 10.1002/oa.814

Weapon Injuries in the 12th Century Crusader Garrison of Vadum Iacob Castle, Galilee

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ABSTRACT This project analyses the wounds sustained by those defending the Crusader castle of Vadum Iacob, which is to the north of the Sea of Galilee in Israel. To our knowledge this is the first Crusader castle garrison to be excavated and studied, and consequently gives unique information concerning medieval battle wounds. The Muslim forces of Saladin stormed the castle in August 1179. The skeletal remains of five of the garrison who were killed during the siege and the execution which followed have been studied, providing a vivid portrait of what it must have been like in the last hours as the castle surrendered. Multiple sword and arrow wounds were noted, and arrowheads were still *in situ* at the time of their deaths. All the soldiers appear to have been stripped of their armour and then dumped together with corpses of horses that died in the battle. We explore the nature and anatomical location of the wounds in the context of medieval Islamic weapons, battlefield tactics and the defensive armour of the Crusaders. Despite the limited number of soldiers discovered, the unique nature of this site makes the findings of great significance. Copyright © 2006 John Wiley & Sons, Ltd.

Key words: arrows; battlefield cemetery; Crusades; siege; sword cuts; wounds; Vadum Iacob Castle; weapon injuries

Introduction

The discovery of the undisturbed site of an historic battle is a rare and special find in archaeology. The excavations of fallen soldiers at Visby, Aljubarrota and Towton have greatly improved our understanding of battlefield injuries in the medieval period (Ingelmark, 1939; Cunha & Silva, 1997; Fiorato *et al.*, 2000). While it is widely thought that medieval warfare and wounds are well understood, we would argue that we actually know desperately little. The biggest problem is that these three medieval battlefield excavations are the only ones to have ever published a detailed study of the weapon injuries among the casualties. This is profoundly limiting for several reasons. The dates of the battles are all in the late medieval period (14th–15th centuries), and so we are ignorant regarding the 10–13th centuries. Battle tactics, armour design and weapons all changed tremendously over this time. The geographical locations of the published battles are actually at the peripheries of Europe (Sweden, Portugal, England), so we cannot rely on them to be representative of areas such as central Europe or the Mediterranean world. Each of the published battles was between European cultures, so we have no archaeological evidence for the wounds sustained when fighting other cultures around the Mediterranean, such as Islamic or Byzantine troops. These medieval superpowers were much larger, more powerful and culturally

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Received 14 September 2004
Revised 13 March 2005
Accepted 17 March 2005

richer than any country in Europe at that early time. Finally, none of these published studies are of battles involving the siege and sacking of a castle, but were all pitched battles in the landscape.

These points highlight how mistaken we may be if we presume that all medieval battle casualties would have followed the pattern noted at Visby (Ingelmark, 1939). To rectify this, it is important that we undertake archaeological projects that fill in these major gaps in our knowledge. This is not always easy, as often a group of males with wounds may be excavated from a town cemetery but the particular battle, the location and date remain at best educated guesses (Stroud & Kemp, 1993). Despite this difficulty, the study of town cemeteries as well as battlefields can still be useful. Using this approach we can identify those with healed wounds who survived the battle and were buried back in their communities many years later, in contrast to those who sustained fatal injuries on the battlefield itself (Boylston, 2000; Weber & Czarnetzki, 2001). A number of excavated medieval sites of this kind in the eastern Mediterranean have demonstrated evidence of trauma and weapon injuries (Mitchell, 1999, 2004a; Smith & Zegerson, 1999; Barnes, 2003). Although limited in number, these sites do help us place the finds at Vadum Iacob into some kind of perspective. However, it is only when a sufficient number of battlefield excavations have taken place that we can tentatively say that we are starting to understand medieval war injuries in all their forms.

The skeletal remains from Vadum Iacob Castle presented here do help us one step towards that goal. The numbers under study are limited, but for a whole host of reasons the findings are highly illuminating. This is an excavation of a battle during the Crusades, taking place at a castle dated to the 12th century, where Europeans fought Islamic troops. All these facts make this case extremely unusual. Unlike so many other castles, the area has been virtually undisturbed since the siege as it has not been used as a fortification since it was destroyed in 1179. This is rare, since castles were often cleaned up, renovated, and then defended by the victor after a siege. This means that not only are the bodies of the garrison still *in situ*, but so are other items from the battle such as weapons. We also have detailed written records from the 12th century providing so many details which excavation alone could never tell us. For all these reasons, Vadum Iacob Castle has been a particularly illuminating excavation.

The siege and conquest

Vadum Iacob Castle (modern name 'Ateret') lay within the Frankish kingdom of Jerusalem. This kingdom was established after the First Crusade took Jerusalem in 1099. The castle was built to protect the crossing on the River Jordan known as Jacob's Ford, hence the Latin name of the castle. Construction began in October 1178, and the outer wall was completed by April 1179. A garrison of 80 Templar knights, 750 foot soldiers and many craftsmen remained on site in order to complete the work. Less than four months later, on Saturday 24 August 1179, the castle was besieged by Saladin and his army while it was still under construction. The Frankish builders had succeeded in finishing only 15% of the interior of the castle. Not surprisingly the castle fell five days later. Saladin apparently executed the Frankish archers who had been responsible for many of his casualties, and those knights from the Order of the Temple. The rest were taken captive and sold into slavery. Sources claim that Saladin took the armour of about 1000 knights and footmen and large numbers of weapons as booty. The Muslim soldiers then destroyed the castle, throwing some of the corpses of the defenders into a deep cistern, and others into the burning buildings (Barber, 1998; Ellenblum, 2003). This cistern has never been found despite a thorough search by the excavation team. However, the skeletal remains of a number of individuals have been found within a layer of ash, beneath a collapsed building. It is these individuals that are the object of this study.

Description of the pathology

The skeletal remains of five adult males were excavated from Vadum Iacob Castle by the close of the excavation. They were recovered at

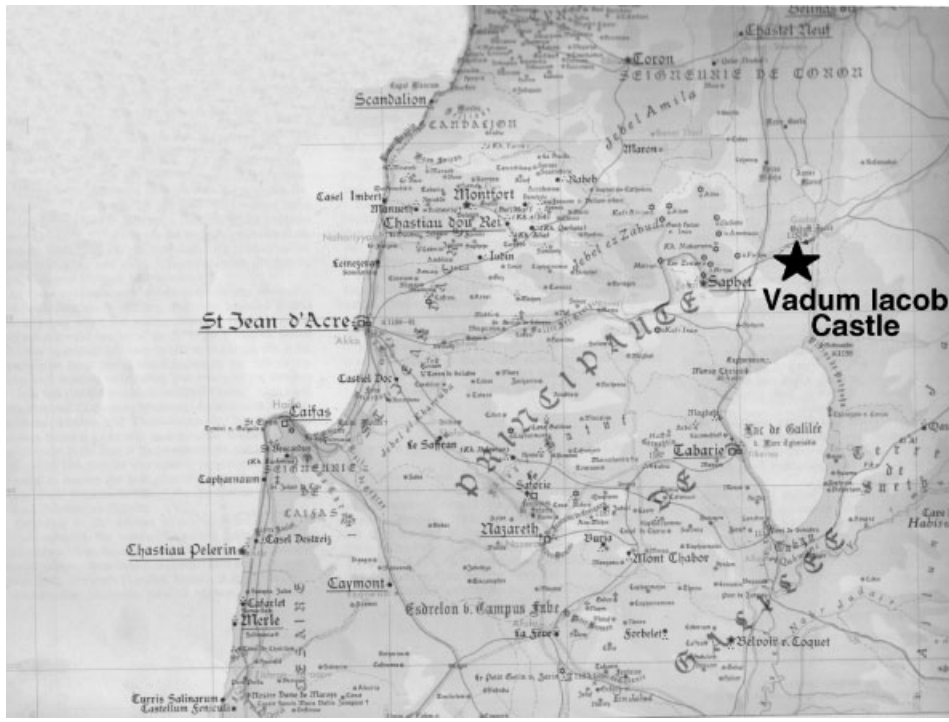

Figure 1. Map of Crusader period Galilee as it was in 1179, showing the location of Vadum Iacob Castle.

the site by the second author (YN). Standard criteria were employed to determine sex and age at death from the skeletal material and their estimated ages ranged between 20 and 40 years. All were recovered in a Frankish context. These individuals were found in a layer of ash under the remains of the only building that had been completed by the time the castle was destroyed. None were formally buried. The bodies lay in an apparently random orientation and with remaining limbs randomly positioned.

Large numbers of identical small, slim, iron objects were recovered during the course of the excavation (Figure 1). They are typically 4.5–6.5 cm long, square or triangular in cross-section, and pointed in shape. These are located throughout the site, both inside and outside the castle walls. The objects are typical of arrowheads as used in battle during the medieval period. The first individual, aged 30–40 years (L.203s), was found with an arrowhead embedded within the anterior aspect of the left iliac bone. A further skeleton aged 20–30 years (L.212) was found with a similar arrowhead intimately associated with the outer aspect of the left humerus, but not buried within the bone. A third man aged 30–40 years (L.929) was recovered with three arrowheads intimately associated with the cervical vertebrae.

The remains of two individuals (L.203n; L.929) also had multiple abnormalities on the skeleton of man-made appearance. They were typically straight, with smooth, shiny margins and sharp edges. One was partial thickness, but the others were full thickness through the involved bone. There was no evidence of periosteal reaction or bone remodelling around any lesion. The appearance of the lesions was most compatible with a diagnosis of weapon injuries from a sharp, thin blade such as a sword. The positions of these lesions are detailed below. L.929 sustained by far the most of these lesions. He was an adult male aged 30–40 years. One wound was present on the left distal humerus at the level of the elbow joint. An oblique lesion ran superolaterally to inferomedially and completely divided the bone in two (Figures 2 and 3). The forearm was not located with him during the

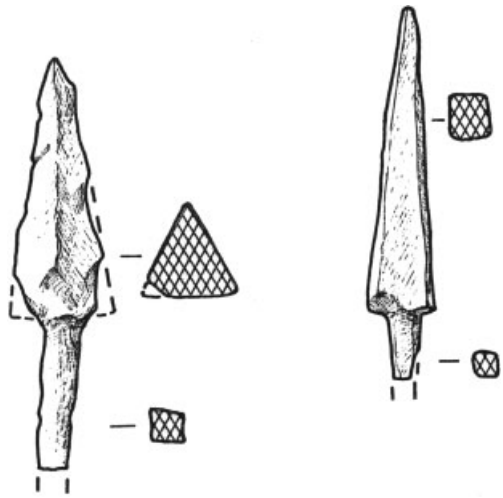

Figure 2. Typical arrows from the excavation.

Figure 3. Sword injury to left elbow, with transection of the distal humerus (L.929). View of posterior aspect of elbow.

Figure 4. Smooth cut surface of distal humeral metaphysis (L.929).

excavation, suggesting that amputation occurred before he reached the building. Another wound was present in the left side of the mandible, which divided it in two (Figure 4). A nearby wound was noted on the adjacent maxilla. The prominence of the maxilla was missing, on account of this wound, suggesting a glancing blow to the cheek. A further wound was located in the frontal and parietal bones at the front of the skull (Figure 5). It was full thickness, oriented in the sagittal plane and divided the surviving cranium into two. The second individual aged 25–30 years (L.203n) demonstrated just one wound, in the humerus of the left shoulder (Figure 6). This was a deep, straight, longitudinal lesion in the head and proximal shaft of the bone, lying in the sagittal plane (Figure 7). It extended into the shoulder joint but did not transect the

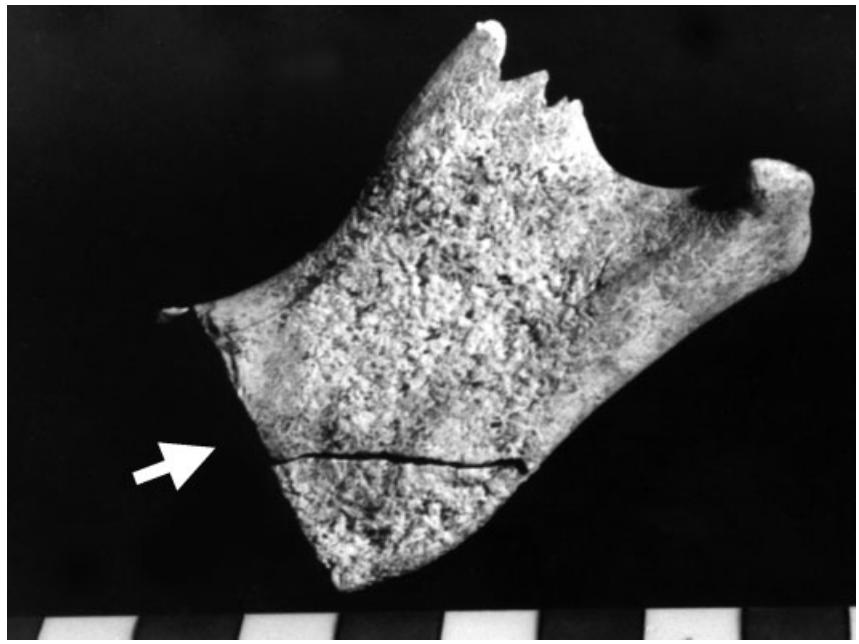

Figure 5. Sword injury to the left side of the mandible (L.929). View of lateral surface.

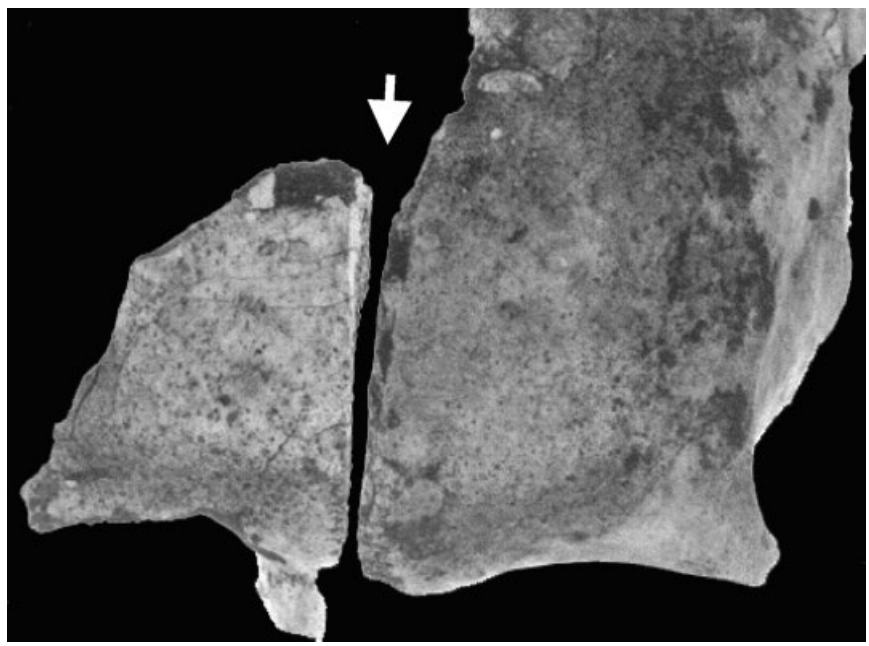

Figure 6. Sword injury to frontal bone of skull (L.929). View of external surface. (Reproduced with permission of Cambridge University Press.)

bone as occurred in L.929. As the bone largely remained intact except for his wound, it was possible to measure its diameter. The diameter of the lesion was 2 mm along its entire length.

The final soldier, aged 25–30 years (L.930), was found with the other four. No wounds were visible on the remains that had survived, and it is presumed that he died from soft tissue injuries.

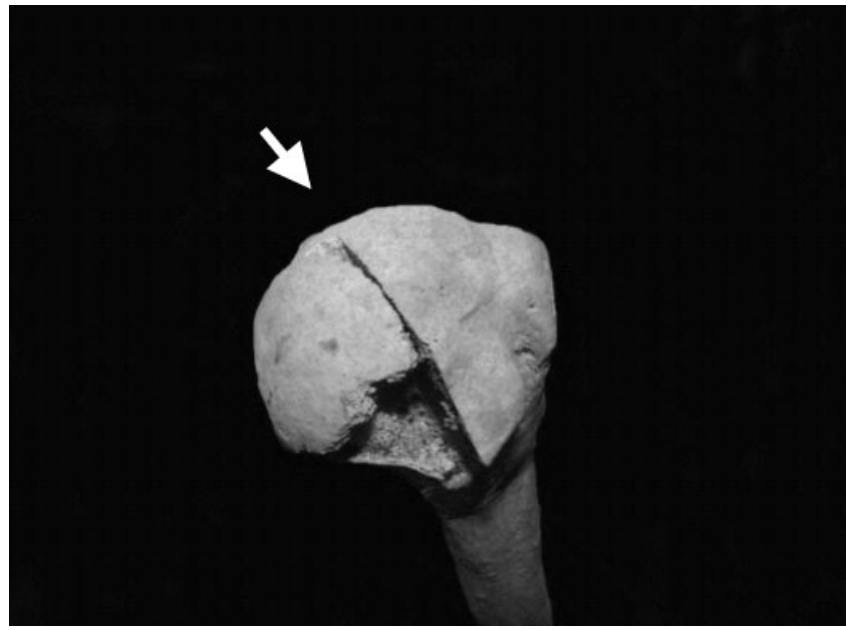

Figure 7. Sword injury to the left shoulder, with partial thickness wound to the humeral head (L.203n). Anterosuperior view. Part of the metaphysis has been lost *post mortem*.

Differential diagnosis

The classic nature of these findings mean than a conventional, wide-ranging differential diagnosis is unnecessary. However, it is sensible to consider the various options that might explain the findings, to ensure our interpretation is reasonable. There are two different types of abnormality described in these remains: the arrowheads and the sharp-edged bony lesions suggestive of blade injuries.

The arrowheads were mostly affected by a degree of corrosion, but a few were in excellent condition (Figure 2). The best preserved of the iron objects clearly have the appearance of medieval arrowheads. They were not barbed or broad, as was used for hunting animals, but of a slim design created to penetrate chain mail in the battlefield setting (Raphael, 1999: 155). The next point to consider is whether finding arrowheads next to bone can safely be interpreted as showing the arrow was actually in the soft tissues at the time of death. If the arrow lay on the ground and the soldier fell on top of it as they died from a different wound, it could be argued that at excavation the arrowhead may be misinterpreted as originally being in the soft tissues. Clearly if the arrow was embedded in the bone, as occurred in one case here, then we can be sure the association confirms an arrow wound. If the arrowhead lay on top of the bones, then we know the soldier did not fall onto the arrow. If the soldier lay on top of the arrowhead but the tip of the arrow pointed downwards into the soil, this would suggest the arrow had landed in the ground during the battle. If the tip pointed upwards towards the soldier, then this would be more compatible with an arrow wound. However, due to the potential for movement of the arrowheads during the decomposition process, there will never be absolute certainty that such arrows were within the soft tissues at death if they are found underneath the skeletal remains at excavation.

The other abnormalities under discussion were straight, sharp-edged lesions of the bone with smooth, polished sides. One was measured to be 2 mm wide along its entire length. These certainly had the appearance of man-made changes, and no organic *in vivo* pathology tends to cause such straight edges. Excavation using poor techniques can lead to damage to skeletal remains with straight edges, if trowels or similar implements gouge into the bones. However, the appearances

of such pseudopathology are very different to those seen here. Trowel damage during excavation tends to leave crumbling, rounded edges, since no protein remains in the bone to give it strength. For sharp edges and smooth polished surfaces the changes must be made around the time of death, before the protein is lost. Furthermore, the lesions were of the same colour as the bone elsewhere, and not pale as occurs in excavation damage. In consequence, these lesions are not compatible with peri-excavation trauma. These certainly have the appearance of perimortem sharp force weapon injuries.

Discussion

In just these five soldiers we have a range of weapon injuries that are highly informative for our understanding of 12th century siege warfare. We are now in a position to discuss the nature of the soldiers in the army, the severity of their wounds, the role of different weapons in different stages of the battle, the relationship between Frankish armour and wounds from Islamic weapons, and treatment of the bodies by the victors after the battle. We can also integrate this archaeological information with written descriptions of medieval battles and wounds (Mitchell, 2004b), to maximise our understanding of the field.

The soldiers in the garrison

Written records tell us that the garrison at Vadum Iacob Castle comprised knights and foot soldiers from the Order of the Temple and the army of the king of Jerusalem, together with the craftsmen who were building the castle. We will never know exactly whom these five individuals were, and why their bodies in particular were dumped in the burning building while the rest were thrown into the cistern. They may have been high-ranking members of the Frankish troops and so separated out from the rest. However, they may just have been foot soldiers that happened to die at that spot, and were not thrown into the cistern as they had already been covered by the burning building. Since the majority of soldiers in the army of the king of Jerusalem were craftsmen and farmers called up to fight in times of need, there would have been little or no distinction between professional soldiers (mercenary or Templar) and craftsmen during such a battle. The ages of these five men are interesting. All five were aged between 20 and 40 years old. Despite the known shortage of military personnel in the Frankish states Latin East during the time this castle was built (Hamilton, 2000: 54–5), there is no evidence here for the use of child soldiers or conscripting the elderly to bolster numbers in the army.

Battle wounds or execution?

The written sources (Ellenblum, 2003) mention that some of those captured when the castle fell were executed. It is important to consider whether the dead under examination here died from battle wounds or execution wounds. Clearly those executed in this context would be likely to have been killed with weapons that the conquering army already had with them. There would be no point in constructing other methods of execution, such as a gallows for hanging. There are records that describe how some 12th century Islamic rulers executed their crusader captives (Mitchell, in press). In 1119 the troops of Il-Ghazi of Aleppo used their Frankish captives for arrow and lance practice (Walter the Chancellor, 1999: 163). However, at Vadum Iacob there was no evidence for such injuries to the chest or upper abdomen, where we might expect to find them after close quarter archery on restrained, unprotected victims. In 1191 Saladin beheaded a number of his Frankish captives (Ibn Shaddad, 2001: 168–77). However, there was no evidence for blade injuries to the cervical spine in these Vadum Iacob individuals. While we cannot be completely certain, it seems more likely that the five excavated individuals described here died from battle wounds, rather than execution after the garrison surrendered.

Fatal and non-fatal wounds

The next point to consider is the nature of the wounds sustained. One soldier had the front of

his skull cleaved in two, with a blow deep into the brain. He also had his left arm amputated through the elbow. Both of these wounds would have been fatal, due to brain damage and blood loss respectively. He also sustained non-fatal blade wounds to the left side of his face, completely dividing his mandible in two and slicing off part of the maxilla. This same man sustained three arrow wounds to his neck. In theory he may have bled to death from such wounds if the major blood vessels there had been punctured, or he may have asphyxiated if the airway had been damaged. However, the severity of his blade wounds suggests that he probably did not die from these arrows, but from the sword wounds he sustained in close-quarter fighting. The man found with the arrow in his pelvis might in theory have died from that wound too. Based on the orientation of the arrowhead at excavation, the arrow should have entered the abdomen from the soldier's right side and passed through the soft tissues to become lodged in the left side of the pelvis. If it transected the large blood vessels that run close to this area, he could have quickly bled to death. The evidence for wounds in the other soldiers is vivid, but while the injuries must have been painful and debilitating, they were not life-threatening. A partial thickness sword blow to the shoulder, or arrow embedded in the outer aspect of the upper arm, could not have damaged the major blood vessels. It seems that these members of the garrison probably died from other soft tissue injuries, of which no evidence remains today.

Common wounds in the battle

It is helpful to know which were the most common wounds, and infer from this which were the weapons found most useful in the battle. Islamic written texts on warfare, and art depicting soldiers, have shown a range of weapons in use by Muslim troops (Nicolle, 1988, 1994). We know such soldiers used the sword, dagger, axe, mace, and projectile weapons such as the bow, crossbow and javelin. Cavalry also used the lance and spear. From the deaths of these Frankish soldiers, it is clear that the wounds were largely due to arrows or crossbows, and blade injuries. It is more than likely that with a larger sample we may have found depressed skull fractures from mace blows or stab wounds from daggers, but they were not visible on the material available for study. We can understand that lance thrusts might not be common in those defending a castle, as the lance was most effective as a weapon in open spaces where a horseman was free to manoeuvre. Any horsemen who broke into the castle compound may well have used their close-quarter weapons instead, such as their swords.

It is hard to know exactly when the dead Frankish soldiers sustained their arrow wounds. Projectile weapons such as arrows and trebuchet stones were the easiest way for the besiegers to attack the garrison until such time as the walls had been breached, and so the arrow wounds may have been sustained during the siege. However, medieval written sources describing battles often mention how such arrows were pulled out during the battle. This was performed by the wounded man himself, by his companions or by a nearby medical practitioner on the battlefield (Mitchell, 2004b). In consequence, the finding of these arrows still *in situ* within the bodies of the dead suggests an alternative explanation. It seems most likely that these wounds occurred shortly before death, and that the soldiers did not live long enough to remove the arrows from their bodies. It may be that they died shortly after and so no-one bothered to remove the arrows, or that they sustained the arrow wounds during the sack of the castle itself when it was every man for himself.

Defensive body armour

It is interesting to look at the distribution of wounds on the bodies, bearing in mind the defensive armour usually worn by crusader and Frankish soldiers in the 12th century. Typical 12th-century Frankish chain-mail (the hauberk) covered the head, chest, abdomen, thighs and shoulders. The face was left exposed, and the mail stopped just above the elbow and the knee (Edge & Paddock, 1996). Under this was often worn a padded lining which helped to dissipate blows from the mace and impede the penetration of any arrows. By the 1170s the helmets worn by

knights were mostly rounded over the skull with some facial protection, but a few may have worn the newly developed great helm which gave much more facial protection. By the end of the 12th century the kettle hat became popular among foot soldiers. This was rounded over the skull and had a wide brim, which gave reasonable protection without impeding vision, but did little to protect the face (Edge & Paddock, 1996). It seems that there was enough chain-mail within the castle to protect most, but perhaps not all, of the men in the castle. This has to be borne in mind when interpreting the remains, but we have only a limited idea today as to what each excavated individual might have been wearing at their death.

Two of the five skeletons had sustained deep sword blows to the bones, and consideration of their depth is rather interesting. If we concentrate on the blows to the limbs we can see that one was partial thickness, while the other completely amputated the arm. It is, of course, possible that the former blow was just not struck as hard as the latter, but another explanation may be the presence of chain-mail. The blow to the shoulder would have been significantly impeded by the mail and underpadding that would typically have protected that area. However, the site of the wound to the elbow was just below the level where mail usually stopped at this time period, and the elbow would have been largely unprotected. In consequence, the contrast in wound depth may be demonstrating the effectiveness of medieval chain-mail. While it could not always prevent injury from a heavy blow with a sharp sword, it could slow the blade sufficiently to convert a fatal wound such as limb amputation to a less severe wound where survival was more likely.

Chain-mail would have given little protection from blows to the face and forehead, as the hauberk did not cover this area. The helmet may have given protection, depending upon the type worn. Only the great helm gave much facial protection, but their use within the castle is undetermined since they were a recent invention at that time. Other helmets gave little facial protection and would not have prevented the wounds to the mandible and maxilla noted in one garrison soldier. The blade injury to the forehead that entered deep into the brain may just have been from an immensely powerful attacker, or may have followed the loss of the helmet during the battle.

Another point we need to consider is what the distribution of the sword wounds actually signifies. Four of the five wounds were in areas of the body that were not protected by the hauberk. One possibility is that blows with the sword were applied all over the soldiers' bodies, but that hardly any penetrated the chain-mail. This could have resulted in mainly those blows to unprotected areas causing the wounds seen at excavation. However, another possibility is that the attackers may have been actively targeting those areas of the body that were not covered by the hauberk. This would still explain the distribution of the wounds, but also result in less expenditure of energy with each effective blow, and reduce blunting of the swords against armour.

If we accept that the soldiers were wearing chain-mail, then the presence of arrows in soft tissues at the time of death is important. It seems that whatever degree of protection the mail and underpadding did give the soldier, at least some of the arrows were able to puncture through these layers. This agrees with evidence from written sources (Mitchell, 2004b). Clearly, medieval soldiers would not have bothered to wear armour if it did not help protect them to some extent. However, even the best armour did not guarantee to keep the wearer safe, and could be penetrated by the right kind of arrowhead.

Comparison with other battles

Having thoroughly analysed the location, number and type of wounds sustained by these five men, it seems sensible to compare the findings with the few past medieval battlefield excavations that have taken place. All the five sword wounds were noted on the front of the soldiers, not on the back. This is most compatible with hand-to-hand fighting while facing the opponent, not while running away from them. All sword wounds were on the left side of the body, which is where a right-handed attacker would naturally land their strongest blows. Almost all were full thickness wounds, right through the bone. These findings are in contrast to the pattern seen at

Visby, Towton and Corinth. In these series, wounds were present on all aspects of the skull, albeit more commonly on the left at Visby, and a large proportion of them were partial thickness (Ingelmark, 1939; Fiorato *et al.*, 2000; Barnes, 2003). It seems that those garrison soldiers who sustained sword wounds were not in disarray or trying to flee, but were standing their ground in an attempt to defend themselves. This may represent good military discipline among the troops, or may merely reflect that in a besieged castle with enemy soldiers pouring through a breach in the walls, there is nowhere to run to.

Conclusion

Analysis of the garrison who died in the siege of this medieval castle has been surprisingly illuminating. Although only a limited number of soldiers has been recovered, it is the nature of the site that allows us to recreate their last hours so vividly. The 12th-century date of the battle, the location being a castle siege, and the circumstances being a Crusader battle with Saladin, all make this site unique. The excellent historical records and undisturbed location also aid archaeological study and interpretation.

Despite the known shortage of Frankish soldiers at the time, there was no evidence for the conscription of children or elderly in the garrison. The findings suggest that the arrow and sword were responsible for many wounds during this battle. The weapons used were not the full range seen at open battlefield sites, and this may reflect the nature of this battle, that of a siege. Variation in the depth of some sword wounds fits in well with our knowledge of medieval defensive armour. The distribution of sword blows would be explained either by chain-mail being highly effective in stopping a sword, or by the deliberate targeting of unprotected areas of the body by the attacker. Information from archaeological excavation clearly leaves us ignorant of those soft tissue injuries sustained in the battle, and for this kind of information only descriptions in historical records are of help. However, the bony injuries do indicate that the fighting was brutal, and must have been harrowing for those who died that summer's day in 1179.

Acknowledgements

The excavation of Vadum Iacob Castle was funded by the Binational Scientific Foundation and the Israel Scientific Foundation.

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