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beyond the theme

Fabrizia Andriani, Fabio Armenise, Ginevra Anna Panzarino, Sandro Sublimi Saponetti*

Signs of interpersonal violence and war: paleotraumatology in Apulia during the Late Antiquity and the Middle Ages

1. Introduction

Since the 1990s, many archaeological excavations have been carried out in cemeteries in Apulia (Southern Italy) dated from Late Antiquity to the Early Middle Ages (400-1000 AD). Numerous skeletal remains have been discovered and studied over the years by the Anthropology Laboratory of the Department of Biology at the University of Bari Aldo Moro, and among them a number of individuals with signs of violence. The purpose of this study is to determine the nature of these lesions based on historical, archaeological, anthropological and paleopathological sources. Through statistical analysis of the injuries, it is possible to identify distribution according to age, sex and skeletal region, hypothesize the weapons used, reconstruct how violent acts were committed and acknowledge cultural influences (if any). After the section on 'Materials and Methods', the 'Case Studies' section describes the archaeological context and samples in chronological order. For each individual, there will be a description of all the lesions detected, the identification of the weapons used and a plausible recon-

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Sandro Sublimi Saponetti supervised the study and dealt with the anthropological and paleopathological aspects of skeletal remains; Fabrizia Andriani has carried out the statistical analysis and made the charts; Fabio Armenise studied the lesions, recognized or hypothesized the weapons, and reconstructed the actions causing the traumas; Ginevra Anna Panzarino has been involved in the analysis of the historical and archaeological context, organised the photographic apparatus and coordinated the final draft of the paper.



Fig. 1. Italy, Apulia: map of the sites mentioned in the paper.

struction of the violent action. The lesions will be described and analysed providing photographs and charts, while the violent action will be hypothesized. In the last part of the study ('Results and discussion') the statistical data will be discussed, according to traumatological elements (injury type, distribution, weapon typology, reconstruction of the action, type of violence) and geo-cultural factors (context, history, distribution of sites, possible cultural influences).

2. Materials and methods

The material will be presented in chronological order, from the Baptistery of San Giovanni in Canosa (BT), San Giusto in Lucera (FG), Piano San Giovanni in Canosa (BT), Faragola in Ascoli Satriano (FG) San Pietro in Canosa (BT), Palazzo Rendella in Monopoli (BA) and Chiesa Madre of Casamassima (BA) (fig. 1, tab. 1). The oldest, dating back to the middle of the 5th century AD, is the Baptistery of San Giovanni in Canosa (BT). The most recent one, which dates back to the 11th century AD, is Palazzo Rendella in Monopoli (BA). These sites are located in the northern and central parts of the region: Canosa, Lucera and Ascoli Satriano in the North; Casamassima and Monopoli in the center. Canosa (BT)

City	Site	Dating	N.
Canosa di Puglia (BT)	Baptistery of San Giovanni	5 th century AD	1
Lucera (FG)	San Giusto	6 th century AD	6
Canosa (BT)	Piano San Giovanni	7th century AD	1
Ascoli Satriano (FG)	Faragola	7th century AD	1
Canosa (BT)	San Pietro	7th century AD	6
Monopoli (BA)	Palace Rendella	8th-11th century AD	14
Casamassima (BA)	Chiesa matrice	10th century AD	9

Tab. 1. List of archaeological sites and number of individuals.

has been the focal point of most research, as several excavations have been carried out by universities. The skeletal samples are of 38 individuals, not always fully preserved, with single or multiple lesions. The most numerous samples are those of Palazzo Rendella in Monopoli (BA) and of Chiesa Madre of Casamassima (BA).

The biological and paleopathological profile of individuals have been reconstructed according to the following aspects: identification of metric and morphometric features (Martin, Saller 1956-59); determination of age and sex (Ferembach et al. 1980; Lovejoy et al. 1985); identification of nutritional and/or stress diseases, periodontal disease and caries (Brothwell 1981; Larsen 1999), tartar build-up (Dobney, Brothwell 1987) and degree of dental wear (Molnar 1971), enamel hypoplasia lines (Goodman, Rose 1990), markers of skeletal biomechanical stress - syndesmosis lesions, enthesopathies, new articular surfaces and degenerative joint diseases - (Rogers et al. 1987; Kennedy 1989; Palfi 1992; Lai, Lovell 1992; Robb 1994; Robb, Mallegni 1994; Mariotti et al. 2007); degenerative changes of the spine (Borgognini Tarli, Repetto 1986); estimation of body mass (Ruff et al. 1997); analysis of the cross sectional geometry of the humerus and femur (Tracey et al. 1994; Larsen 1999; Capasso et al. 1999; Ledger et al. 2000; Stock, Pfeiffer 2001) and the human typologies (Thoma 1988). Statistical analyses are based on the incidence and percentage frequencies of individual data (Cavalli-Sforza 1983; Cohen 1993).

A datasheet was designed to record all the useful aspects to study traumas and their interpretation, with this structure:

NAME: City, archaeological site (chronology) eg. *Casamassima, Chiesa Matrice (10th sec. AC)*;
GRAVE: Initials eg. *CAS28us180*AGE: "infant", "juvenile" "adult", "elderly" (age range) eg. *Adult (40-44)*; HEALTH STATUS: clinical picture eg. Button-shaped osteoma on the skull; BONES FOUND: Percentage value¹ eg. 26,4%; CRANIAL/POSTCRANIAL WOUND2: BONE, position and side, measure and angle, type ("blunt", "bullet", "blade", "point", "unknown") eg. 1) Cranial wound: Right PARIETAL, sagittal suture 12 mm away from the lambda. Blade, penetrating (9° from the bottom, transverse diameter 51 mm, supero-inferior diameter 32 mm). Peri mortem: 2) Cranial wound: MANDIBLE, left branch, underneath the coronoid process. Blade (1,5 mm deep; antero-posterior diameter 16,5 mm). Ante mortem. No. of TOTAL WOUNDS: guantity eg. 2; No. of CRANIAL WOUNDS: guantity eg. 2; No. of POSTCRANIAL WOUND: quantity eg. 0; SKULL: Type (Lesion identification no.) eq. Blade (1 Cranial wound; 2 Cranial wound); UPPER LIMBS: Type (Lesion identification no.) q. 0; TORSO: Type (Lesion identification no.) eg. 0; LOWER LIMBS: Type (Lesion identification no.) eg. 0; WEAPON: Lesion identification no.: type and identification eg. 1 Cranial wound: blade, long (sword); 2 Cranial wound: blade, long (sword); DYNAMICS OF ACTION: Lesion identification no.: position and number of aggressor/s, type of shot ("downward", "middle", "upward"), direction of the weapon ("from below", "from above", "from right", "from left", "unknow") eq. 1 Cranial wound: posterior aggressor, blow from left to right; 2 Cranial wound: posterior aggressor, blow from left to right; EPISODE OF VIOLENCE: "ambush", "battle", "skirmish", "unknown"

eg. unknow.

The determination of the type of injury and weapon was performed by comparison with other data known in literature (De Vita 1983; Lovell 1997; Shaw 2001; Mitchell *et al.* 2006; Stefan *et al.* 2006; Novak 2007; Roksandic *et al.* 2007; Fornaciari, Giuffra 2009; Slaus *et al.* 2010; Milner *et al.* 2015; Constantinescu *et al.* 2017). In the classification of the blows in the italian version of this study we

¹ Calculated on the total number of human bones (around 203).

² Each lesion has a progressive number.

adopted a terminology drawn from medieval defensive treaties (cf. Rapisardi 1998): fendente meaning "downwards blow", mezzano "middle blow" and sottano "upward blow"; mandritto "from right to the left", manrovescio "from left to right". As for weapon identification, this was determined by the joint examination of the morphology of the injury and the historical context. The reconstruction of the blow and the dynamics of the act of violence has been reenacted with a fencing master (Fabio Armenise). We used several weapons and reenacted the blows on the bones from different positions, to understand the direction and type of the blows but especially the position of the two fighters. In the case of multitraumatized individuals with blows interpreted as 'overkill' (Grey Friars Research Team 2015, p. 68; Solarino et al. 2019) this was not always possible. In fact, analysis of the direction in which blows were inflicted varied depending on the position of the victim in relation to the aggressor(s). In these cases, the victim was often lying on the ground, unconscious or dead, and the enemy kept on striking on the body. The enemy was often enraged and did so to damage with his fury the victim's body or to reclaim a sort of personal glory.

3. Case studies

3.1. Canosa, Baptistery of San Giovanni (mid 5th century AD)

In Canosa (BT) in Piano di San Giovanni (section 3.3) several excavations were carried out in the 70s by the then Soprintendenza Archeologica della Puglia and from 2002 to 2010 in collaboration with the Universities of Foggia and Bari (Giuliani *et al.* 2012). The Early Christian worship building, commissioned by Bishop Sabino (514-566), is a baptistery with a central plan. Here the remains of some individuals with injuries dating back to the pre-Roman period (Sublimi Saponetti *et al.* 2010) and the mid-5th century (Sublimi Saponetti *et al.* 2008) were found (tab. 2).

BSG1 is an adult male (40-44 years) 172 cm tall and weighing approximately 80 kg. Two hypoplasia lines and some caries were detected, with moderate dental wear and tartar build-up; muscles are well-shaped and there are signs of moderate arthrosis especially in the lower limbs; traces of non-specific infection, periostitis of the tibia and a button-shaped excrescence on the left orbit are also visible. This man presents multiple traumas, both cranial (fig. 2a) and postcranial (fig. 2b), two with scarring and ten showing that no healing had occurred. The first perimortem injury (*1 Cranial wound*) is on the right squama of the frontal bone and the back end touches the *pars bregmatica* of the right coronal suture. It has a v-shape, with anterolateral/posteromedial oblique orientation. The lateral half has been cut by a blade, while the medial half for this reason has a wrinkled

Acronym	Sex, age	Bone, district	Wound
			Sharp
			Sharp
		Skull	Sharp
		Ordi	Sharp
BSG1 M Mat			Puncture
	M Mat		Drilling?
			Sharp
		Jaw	Sharp
			Sharp
		L. Humerus	Sharp
		L. Rib 11-12; L2-L4 L.; Sacred; L. Iliac wing	Sharp

Tab. 2. Canosa (BT), Baptistery of St. John: list of individuals with injuries.



Fig. 2a. BSG 1. Injuries on the skull.

surface. The second injury (2 Cranial wound), has also a v-shape and is located on the left parietal bone; it has the same characteristics of 1 Cranial Wound, but with a transverse orientation. In both cases these lesions are caused by a bladed weapon used in a semi-tangential direction. In this case the weapon, while being pulled back, chipped the bones. Particularly in the second case, the recovered fragment of external diploë chipped off by the blade confirmed our idea. The third wound (3 Cranial wound) involves the frontal bone, the right coronary suture and the right parietal bone: it has a slightly obligue and transverse angle. The blade perforated the bone in an orthogonal direction and the signs produced by the passage of the blade are visible in the outer part of the diploë. An antemortem lesion (4 Cranial wound) is at the back of the left parietal bone almost near the lambdoid suture. Due to the poor preservation of the cranial area, it is possible to observe solely the upper edge, that appears sclerotic and smoothed with an obligue antero-lateral and postero-medial orientation. For this reason, the injury might be the result of an old healed trauma probably followed by a craniectomy and a wound cleaning. On the right temporal bone, a few millimeters above the outer acoustic meatus, the bone is completely perforated (5 Cranial wound), and the lesion is star-shaped and surrounded by signs of an inflammatory reaction (cribrosity). This may have been caused by a pointed object that penetrated orthogonally the bone. There are five unhealed injuries caused by a sharp object on the facial bone and the jaw. The left zygomatic bone displays across its width a horizontal semi-tangential injury (6 Cranial wound) caused by a bladed weapon with a blow from top to bottom. Underneath, while removing the weapon, a bone fragment was partially cut off. The maxillary right canine crown (7 Cranial wound) and the mandibular second right molar (8 Cranial wound) appear broken. In both cases, the enamel of the crown on the vestibular side is chipped. The upper part of the right mandibular branch (9 Cranial wound) is crossed by an obligue fracture line that starts with a blade lesion located on the posterior rim of the branch and completely cuts the coronary apophysis. The blade lesion itself shows a small semilunar cut section at the lower level with postero-inferior and anterior-superior obligue orientation, while the upper part of the wound points out the consequences resulting from removal of the weapon. At the top of the gonion of the left mandibular angle, there is a minute, barely visible lesion (10 Cranial wound) with no signs of healing. The lesions involving the zygomatic bone, teeth and gonion may be the result of four blows.

The last lesion could be due to both a downward blow or a middle one with a slight inclination from the bottom up. Two traumatic events are visible on the postcranial skeleton. An oblique triangular smooth cut is present on the left humerus, particularly on the lateral edge of the distal surface (*11 Postcranial wound*). The lesion direction is lateral-superior and medium-inferior and displays a damaged area caused by the removal of the weapon. The injury may have been caused by the victim's attempt to parry the blow. The left side of the trunk

displays extensive bone loss, involving the XI and XII thoracic ribs, all the lumbar vertebrae, the sacrum and the back of the iliac wing (*12 Postcranial wound*). The thoracic ribs XI and XII have a clean cut. The bone loss is located in the lateral margin and in the transverse processes of the left side of the lumbar vertebrae and the first sacral vertebrae, along a vertical oblique plane. The wing of ilium shows a destroyed bone matrix.

The morphology of the coastal lesions indicates the direction of the blow, a violent downward slash from an aggressor standing on the left side behind the victim's back. We can hypothesize a correspondence of the rib, vertebrae and coxal lesions, if we imagine that the victim had the trunk in a twisted and bent posture to the right. Likely, the weapon used for the deadly blow may have been a bladed weapon with high penetration power, such as an axe. The individual may have been the victim of an ambush by several aggressors wounding continuously without cease, perhaps even while lying on the ground.

3.2. Lucera, San Giusto (6th century AD)

During the excavations carried out by Foggia University in 1999, a large cemetery was discovered in San Giusto (Lucera, FG), between the funerary basilica and the productive area of the villa (Volpe *et al.* 2001, 2013). Dating back to the 6th century AD, the cemetery can be divided into



Fig. 2b. BSG 1. Injuries on the postcranial skeleton.

five areas: the funeral basilica, the narthex with the rooms attached to the basilica, the pastophories in the area behind the apse, the area between the baptistry and the baths; and finally the production area of the complex. In 103 graves, 120 individuals have been divided by sex and social class: 29 are subadults and 85 adults, including 55 males, 15 females, and 15 of unknown sex. The bones showed many diseases and some skulls had Mongolian features and cranial deformation (Sublimi Saponetti *et al.* 2005). In the San Giusto samples, six individuals presented some injuries (tab. 3).

Acronym	Sex, age	Bone/district	Wound
SG98	M Ad	Tibia	Puncture
SG124	M Ad	Skull, parietal	Puncture
SG130	М.Уоцра	Skull, frontal	Sharp
00100		Skull, frontal	Puncture
SG 11832	M Ad	Skull, frontal	Blunt
00 0302			Puncture
SG us45	M Ad	Skull, parietal	Puncture
	M Ad	Skull frontal	Blunt
			Sharp
SG us292		Skull, occipital	Blunt
		No. 3 R. Ribs	Fracture
		No. 3 R. Ribs	Fracture

Tab. 3. Lucera (FG), San Giusto: list of individuals with injuries.

SG98 is an adult male that shows on the skull features of the Mongol human type. These features are hyperbrachicrany, stenometopy, numerous wormian bones, a flattened midface with the maxillar ascending apophysis on an almost frontal plane, as well as the upper medial "shovel incisors". A perimortem puncture wound is present on the left tibia, on the antero-lateral surface of the distal epiphysis (*1 Postcranial wound*) (fig. 3). The wound, showing no healing process, is a full-thickness cut and v-shaped. The weapon used was a projectile (arrow), thrown from far away by an enemy in front of the victim. The scenario may have been an ambush, perhaps linked to a war episode.



Fig. 3. SG98.



Fig. 4. SG124.

SG124 is an adult male with a sub-circular puncture wound on the left parietal bone of the skull (*1 Cranial wound*) (fig. 4). It is an unhealed postmortem wound, caused by a pointed weapon, such as an arrow, shot by an enemy placed in front of the victim and from far away with a trajectory from top to bottom. In this case the wound may be the result of a war ambush as well.

SG130 is a juvenile male (16–17 years old), 170 cm tall and weighing approximately 70 kg. His health and nutritional status cannot be defined as either poor or very good, since the percentage of medium-diaphyseal cortical section of the humerus (%CA) is 68%. The stress markers reveal the use of muscles for manual work. The frontal bone of the skull shows two traumatic injuries, one of which was fatal (fig. 5). The first (1 Cranial wound) consists of a perforation roughly quadrangular in shape. From the outside, the right antero-lateral margin and the posterior part of the injury has an irregular and raised edge. The left margin has a very well-defined and oblique edge. The endocranial view of injury reveals the opposite effect, with a well-defined edge on the right and an irregular one on the left. On the right side of the lesion there are two fracture lines that completely circumscribe a raised bone area. The lesion was perimortem because the bone reacted to the blow in a way that required a tissue hydration. The absence of bone regrowth suggests that the wound was fatal. The victim was probably violently stabbed with a pointed weapon with a quadrangular section. The second lesion (2 Cranial wound) is on the anterolateral portion of the right frontal bone, consisting of a loss of cortical surface of a circular shape. The bone is cut off tangentially toward the convex part of the frontal squama, showing the typical blade marks. This injury does not show signs of healing. He may have been hit with two



Fig. 5. SG130.

different weapons or by a single weapon with a pointed head e and an opposite sharp side: a tool that presents both features is an occasional weapon like a pickaxe or *dolabra*.

SG us32 is an adult male with two injuries on the frontal bone (fig. 6). The first one (*1 Cranial wound*) is an antemortem triangular blunt force trauma on the medial portion. The second one (*2 Cranial wound*) is a perimortem star-shaped puncture on the right side in front of the *pars complicata* of the coronal suture. In the first case, the wound was caused by a downward blow from right to left by a frontal assault with a club. The puncture was, instead, caused by an arrow shot by an enemy standing on the right side of the victim. The context may have been an ambush, perhaps linked to a war episode.

SG us45 is an adult male with a perimortem quadrangular puncture lesion (*1 cranial wound*) on the right parietal bone (fig. 7). The wound was caused by an assault from the right side of the victim with a downward blow from right to left. The weapon and the violent act cannot be precisely determined.

SG us292 is an adult male with five ante mortem injuries, three on the skull and two postcranial (fig. 8). The first one (*1 Cranial wound*) is a sub-circular blunt force trauma located on the right part of the frontal bone. The second one (*2 Cranial wound*), also a blunt trauma, is sub-circular and located on the right portion of the occipital bone. An old blade wound (*3 Cranial wound*) can also be seen on the left part of the frontal bone. The VIII, IX and X ribs on the right side (*4 Postcranial wound*) and three unidentified ones on the left are fractured.



Fig. 6. SG us32.



Fig. 7. SG us45.



Fig. 8. SG us292.

While the rib injuries cannot be traced back to a specific episode, even though it may have been an extremely violent one, blunt injuries may have been caused by enemies inflicting blunt objects standing both in front of and behind the victim. The blade injury resulted from an enemy standing on the front and attacking with a long-bladed weapon like a *spatha* inflicting a downward blow from right to left.

3.3. Canosa, Piano San Giovanni (7th century AD)

Beside the homonymous baptistery commissioned by Bishop Sabino (514-566) (section 3.1) there is the monumental basilica of Santa Maria with three naves, preceded by a columned portico paved with mosaics. By the end of the 6th century, the basilica was used to house tombs, and this habit went on in the Early Middle Ages. In the 7th century, the atrium in the area opposite the baptistery collapsed and the church of Salvatore was built in its place. In the 11th century a new building for worship was built in the area of Basilica Santa Maria and some parts of the church were transformed into residential or storage areas. One of the recovered individuals (Lavermicocca, Sublimi Saponetti 1990) was found among the remains of the left nave and suffered a cranial lesion (Sublimi Saponetti 1991) (tab. 4).

Acronym	Sex, age	Bone/ district	Wound
PSG3	M Ad	Skull, parietal	Blunt

Tab. 4. Canosa (BT), Piano San Giovanni: list of individuals with injuries.







PSG3 is an elderly male (48 years) about 173 cm tall and with gracile bones. His skull shows similarities with Mongolian ethnicity (hyperbrachicrany, hyperstenometopy, platopia, roundness and wormian bones). A large elliptical-shaped injury is present on the right parietal bone (*1 Cranial wound*) (fig. 9). The injury has a concavity that develops from an antero-posterior angle, with a small sunken area at the bottom perhaps due to a perforation. The wound may have been caused by a blunt object – a club or a stick. The enemy was behind the victim's back hitting with a downward blow from right to left. The scenario may have been a skirmish or an ambush where the victim was running away.

3.4. Canosa, San Pietro (7th century AC)

Since 2001 the Universities of Foggia and Bari and then the Soprintendenza Archeologica della Puglia examined the archaeological site located on the hill of San Pietro in Canosa (BT) near the aqueduct of Herod Attic (Volpe *et al.* 2002, 2003, 2007). The Bishop Sabino (514-566) commissioned the building of an early suburban Christian complex. The church has a large narthex and an *atrium* with porticoed wings, paved with mosaic. This part of the church was later occupied by burials, while other graves were located in an area between the *atrium* and the south residential building. There were different burial typologies with single and multiple burials, generally without grave goods. The sample is composed of 60 individuals out of 23 graves: 31 males, 18 females and 11 undefined sex, of different ages (34% infants). The site may have been considered a healing place

Acronym	Sex, age	Bone/district	Wound
CSP4	M Mat	Nasal bones	Fracture
		L. Rib II	Fracture
CSP12	M Ad	L. Humerus, distal epiphysis	Crushing fracture
		R. Clavicle	Fracture
		R. Ulna	Osteomyelitis
CSP26	M Sen	Skull, parietal	Sharp
		Skull, frontal	Blunt (2)
CSP38A	M Ad	Skull, acustic meato	Fracture
CSP38B	M Ad	Skull, frontal	Puncture
CSP53	M Young	Skull, vertebrae	Sharp
		L. Radiu, ulna	Sharp
		Skull, frontal	Puncture (2)
		L. Tibia	Puncture
		R. Tibia	Puncture

Tab. 5. Canosa (BT), San Pietro: list of individuals with injuries.



Fig. 10. CSP4.

in the past (Sublimi Saponetti *et al.* 2011), as suggested by the concentration of diseases and traumatized individuals (77%) – particularly high incidence of tuberculosis and a case of bone fluorosis. In the San Pietro sample, 12% of individuals have traumas, of which 6 are examined here (tab. 5).

CSP4 is an elderly adult, 175 cm tall and weighing 82 kg. The skeleton is strong and vigorously shaped by tendons and ligaments. The subject shows two injuries (fig. 10). The first (*1 Cranial wound*) is the result of repeated nasal bones fractures which may have been caused by punches received from the front. The second one (*2 Postcranial wound*) is on the second left rib and was caused by a downward blow. Moreover, the individual shows other features. First the ligament of the left knee joint is broken. Secondly, the zygomatic processes reveal a cribriform and coarse area due to a cortical inflammation, which may have been caused by a mechanical irritation from a very adherent headgear. Finally, the jaw front teeth is marked by an atypical wear that may have been due to the habit of pulling leather strings.

CSP12 presents multiple traumas, in particular three lesions can be seen on the postcranial skeleton (fig. 11). The first one (*1 Postcranial wound*) is a lateral third left clavicle fracture, whose callus caused a shortening of the diaphysis. The second (*2 Postcranial wound*) is a compression fracture of the left humerus trochlea (elbow) showing remodelling during the healing process. The third lesion (*3 Postcranial wound*) is a fracture callus with a hole perhaps related to an osteomyelitis inflammatory process on the distal epiphysis of the right ulna. The individual may have had frequent accidents or been subjected to violence (beatings).



Fig. 11. CSP12.

CSP26 is an elderly male. The incomplete nature of the skeletal remains is due to deposition phenomena (bones in a secondary burial outside the grave). The individual has three cranial lesions, two antemortem and one perimortem (fig. 12). The first two lesions (1 and 2 Cranial wounds) are blunt force traumas and sub-circular shaped, located on the frontal bone, one on the central portion, and the other on the left temporal ridge. The perimortem lesion (3 Cranial wound) is a blade cut. It is located on the right part of the frontal bone in an antero-posterior direction. From this wound two lines of fracture start and surround a large crushed area. The blunt injury may have been inflicted by an enemy in front of the victim. The weapon used may have been a rounded object that hit the victim with downward blows from right to left. The cut injury, on the other hand, was allegedly inflicted by an enemy behind the victim and armed with a short blade weapon, perhaps an axe - which would justify both the perforation profile and the crushed area. The individual had already suffered cranial lesions in the past, and in this last scenario he may have been attacked in an ambush or in a battle.

CSP38A is an adult male with an antemortem cranial injury *(1 Cranial wound)* located on the right temporal bone in the external acoustic meatus, which has completely closed (fig. 13). This lesion is due to the impact of the condyle against the back wall of the mandibular fossa. The victim may have been violently hit on the face by an object while having his mouth closed. This kind of injury is common in contemporary case studies of front-impact car accidents³.

³ Pers. comm. of Dr. Nunno of Nunzio, coroner (University of Salento, Lecce, Italy).



Fig. 12. CSP26.





Fig. 13. CSP38A.





Fig. 14. CSP38B.

CSP38B is a male adult found in the same grave of the previous subject. A perimortem puncture injury (*1 Cranial wound*) is present on the right portion of the frontal bone, it is a full-thickness and trapezoidal lesion (fig. 14). The attacker was far and on the right side of the victim when he hit him with a ranged weapon, probably an arrow.

CSP53 is the most studied individual of the site (Di Nunno *et al.* 2007; Sublimi Saponetti *et al.* 2007, 2008; Panzarino, Sublimi Saponetti 2017). He was a juvenile-adult male (about 20 years old), 175 cm tall and weighing approximately 68 kg. He was in good health with a good nutritional status (%CA=84 percent of medium-diaphyseal cortical section of the humerus). The bones revealed signs of considerable physical activity, such as horseback riding. His body suffered many wounds, signs of an intense and violent life, particularly on his skull (fig. 15). The first lesion (*1 Cranial-Postcranial wound*) is a cutting wound caused by a sharp blade. The apex of the left mastoid process had been completely cut, while the third molar crown on the maxilla was broken. The hook-like process in the left pterygoid is absent. The same sharp blade hit the left mandibular branch and completely separated it: the oblique fracture measures 15 mm from the lowest point of the sigmoid incisura. Here a second, very long crack starts that runs downwards on the front, parallel to the inferior margin of the mandible, reaching the chin symphysis. The cut surface is smooth on the detached portion: its



Fig. 15. CSP53.

posterior surface has regular margins, while the anterior part is irregular. The victim's head may have been tilted to the left and his mouth perhaps opened when he was hit from a side in a downward direction. The lateral margin of the inferior left articular facet in the atlas and the homologous transverse process was mostly removed by a thin blade, cutting to a 30° angle. The axis has been cut in several points: the cortical surface has been sliced away, thus exposing the trabecular layer of the dens, the vertebral body and the superior right joint apophysis. In addition, the cranial part of the spinous apophysis and the right tubercle may have been cut away. The lesion has a small cut on the surface with well-defined margins, while the rest of the region is irregular, just like the base of the dens. In the anterior view there is a fracture line running obliguely from the anterior margin of the left superior articular facet to the vertebral body. This line becomes parallel with the vertebral body, ending near the medial margin of the right transverse foramen. Other blade wounds are present on the frontal and parietal bones (2 Cranial wound). Some cuts are semicircular, others run lengthways and they range in size from 5 to 24 mm. Sometimes the most external layer of the bone has been peeled away. The lesions are inflicted with the flat of the blade tangential to the bone: this type of cut and their location are attributed to the practice of scalping (Larsen 1999, p. 119). Two small irregular and star-shaped lesions are displayed on the left parietal and frontal bone (3-4 Cranial wound), probably caused by arrows that had not completely penetrated into the bones. Close to one of these two lesions in the medial portion of the frontal bone, there is an ovalshaped loss of bone. Finally, a cut is present on both the left forearm bones. The blade, cutting posteriorly and downwards, has cut off the proximal epiphysis of the ulna, about 1 cm below the radial notch (5 Postcranial wound). The lesion appears smooth, with a regular margin on the dorsal part, and an irregular margin on the volar one. In the same area two bone fragments are detached: the first is small and triangular-shaped and comes from the dorsal face, while the second is larger and belongs to the volar face. On the dorsal side there are also two fracture lines that start from the lesion and run alongside the diaphysis for about 3 cm. The same blade penetrated barely 1 cm in the radius from above in a dorsovolar direction. This part of the lesion allows us to know that the blade was less than 2 mm thick. Moreover, on the bone dorsal face another thin fragment has been detached from the inferior margin of the lesion. Both tibias show injuries caused by stabbing (6-7 Postcranial wound): the medial surface of the left tibia just below the half diaphysis reveals a circular lesion, while the upper face of the distal end of the right tibia displays an oval-shaped perforation that may have been caused by a sharp-pointed weapon. Moreover, the inversion of tibias and fibulas that occurred in the lying body may have been explained by a perimortem trauma that damaged the knee joints, perhaps following a violent fall from above (e.g. from his horse). The absence of bone remodelling in each of the individual's

injuries is the evidence that were all inflicted on the same occasion. During this long and violent fight, he may have been hit by a number of star-shaped arrows on his legs and on the cranial vault (Golubović *et al.* 2010). He was then hit on his ulna and radius by a light and sharpened weapon while his left arm was abducted and forearm flexed and prone: it could have been a single-edged bladed weapon such as a *langsax*. This type of lesion, very common in literature, may have been a parry injury inflicted while the victim was trying to protect his own head from the enemy's assault with a shield or the arm itself. The cutting wounds that are present on the mastoid process, on the left mandibular branch, on third upper left molar and on the first two cervical vertebrae may have been inflicted during a single back-handed assault using a thin and sharp weapon, maybe a single-edged sword or a *langsax*. The enemy attacked the victim from the left side, while he was turning his head towards the new threat. After these numerous lesions, the young warrior was beheaded and the enemies removed skin and hair from his head as a sign of victory.

3.5. Ascoli Satriano, Faragola (601-700 AD)

Faragola excavations began in 2003 and were conducted by the University of Foggia (Volpe *et al.* 2009, 2012; Volpe, Turchiano 2013; Turchiano, Volpe 2016) and discovered a complex that, from the 2nd-3rd centuries AD, and especially from the 4th and 5th centuries, developed in an important late-antique villa. It consists of a large and luxurious dining room with water features (*cenatio*), *stibadium*, baths, service rooms and storage rooms. At the end of the 6th century, it was converted for housing, agriculture and crafts uses. Between the 7th and the 8th centuries, huts and tombs were found. In the sample, still unpublished and not fully examined, one individual has two injuries (tab. 6).

FAR5 is an adult male with two old injuries, one located on the skull and the other on the postcranial skeleton (fig. 16). There is evidence of an intense bone remodelling, a sign of several fractures caused by repeated blows on the nasal bones (*1 Postcranial wound*). The fifth metacarpal bone of the right hand changed its size and morphology due to a fracture (*2 Postcranial Wounds*). The blows on the nose are similar to those frequently found in subjects involved in boxing com-

Acronym	Sex, age	Bone/district	Wound
FAR5	M Mat	Nasal bones	Fracture
		V Metacarpus	Fracture

Tab. 6. Ascoli Satriano (FG), Faragola: list of individuals with injuries.



petitions as they receive punches on the front of their faces. The injury present on the fifth right metacarpal may be interpreted in two ways: either as an offensive injury – of a right-handed boxer – or a defensive one. Due to the types and distribution of the blows, the individual is thought to have been a wrestler.

3.6. Monopoli, Palazzo Rendella (8th-11th century AD)

Palazzo Rendella in Monopoli (BA) is a building dating back to the Aragonese era (1558-1584), that used to be a barracks. The Soprintendenza Archeologica della Puglia discovered an early medieval church with an outdoor cemetery (Carrieri 1991, 2000) beneath the palace during excavations carried out in 1990-1991 and 1999. Different types of graves (monumental, ditches in the bedrock and grave pits) were found, holding the remains of numerous individuals. The graves are mostly multiple burials and reveal the habit of stacking and moving old bone remains to make room for new corpses. There are numerous individuals with lesions, 14 of which are examined herein (tab. 7); 10 males, 3 adult/elderly women and one individual whose age cannot be determined.

Acronym	Sex, age	Bone/district	Wound
DEN07 indA	MAd	Skull, frontal	Sharp, blunt
NEINZI IIIUA		Skull, L. parietal, occipital	Sharp (3)
	MAd	Skull, frontal	Sharp (2), puncture
neinz9		Skull, R. parietal	Puncture
REN30	M Ad	Skull, R. Parietal	Blunt
	MAd	Skull, frontal, L. Parietal	Sharp
neing2		Skull, temporal, occipital, R. Parietal	Sharp
REN33 ind1	M Ad	Skull, L. Parietal	Sharp
		L. and R. Scapula	
DEN124 indA	M.Voung	L. Humerus	(12)
nLIN34 IIIUA		L. and R. Femur	
		R. Tibia, fibula	
REN35 indA	M Ad	Skull, R. Parietal	Blunt
		Skull, frontal	Sharp
REN35 indD	N.d., Sen	Skull, occipital	Sharp
		Skull, L. Parietal	Blunt
		Skull, frontal	Sharp
REIN39 INDA F AD		Skull, R. Parietal	Sharp
REN41/C indA	M Ad	Skull, L. Parietal	Blunt
		Skull, frontal	Blunt (3), sharp
REN43/C indB	F Ad	Skull, R. Parietal	Blunt
		Skull, L. Parietal	Sharp (2)
		Skull, frontal	Sharp
		Skull, L. Temporal, L. zygomathic, L.	Sharn
		Sphenoid	
REN45/C indC	M Ad	Skull, frontal, L. Temporal	Sharp
		R. Sphenoid	Puncture
		Skull, R. Temporal	Puncture
		Skull, L. Temporal	Blunt
REN48 indC	M Ad	Skull, occipital	Puncture
		Jaw	Puncture
		Skull, frontal	Blunt
REN50 indD	F Ad	Skull, R. Parietal	Sharp
		Skull, frontal	Sharp

Tab. 7. Monopoli (BA), Palace Rendella: list of individuals with injuries.



Fig. 17. REN27 indA.

REN27 indA is an adult male. The skull presents an antemortem blunt force trauma and four perimortem blade wounds (fig. 17). The first lesion is (1 Cranial Wound) an ellipse-shaped blunt force trauma lesion caused by a downward blow from right to left by an enemy standing in front of the victim. The alleged weapon is a mace. The four mortal lesions consist of a sequence of rapidly inflicted blows, with a sword similar to a spatha. The first of these injuries (2 Cranial wound) is located on the left orbital margin and consists of a full-thickness wound with a large crushed area. The second and third injuries (3-4 Cranial wounds) are similar to the first perimortem one and affect the temporal squama. The fourth perimortem lesion (5 Cranial wound) is a penetrating cut located on the occipital bone. A possible reconstruction of the stabbing has the enemy placed at the front of the victim who is hit with a downward blow from left to right. Later, the other injuries may have been carried out by the same aggressor moving to the left back side or, more likely, by other individuals in an overkill scenario. This alleged scenario compared with other cases with the same characteristics places this individual in a proper battle.

REN29 is a male, 20-25 years old, 170 cm tall and weighing 60 kg. His skeleton presents entheses and syndesmopathy. The thoracic and lumbar vertebral apophyses are particularly extended. There are four perimortem injuries on the



Fig. 18. REN29.

skull, two of which are punctures and the other two are blade cuts (fig. 18). The first puncture is on the frontal bone (1 Cranial wound) and the second is on the right parietal bone (2 Cranial wound). They both have a rhomboid shape and do not pierce the bone completely. They have no signs of healing, and they are the result of blows caused by ranged weapons (arrows) from top to bottom. Moreover, two other perimortem injuries caused by a downward blow are also present, and they may have been inflicted around the same time of the previous ones. The first (3 Cranial wound) is located on the left orbital process, where a triangular blade injury caused loss of bones. The other (4 Cranial wound) is located on the right and central side of the frontal squama and consists of a transverse blade injury with a large crushed area underneath. The first blow can be interpreted as a downward hit from right to left, caused by a long-bladed weapon inflicted by an enemy standing in front of the victim. A similar weapon used by the same aggressor or another enraged individual caused the second injury. However, the blow was inflicted from left to right. We hypothesise that the individual examined may have fought in a battle for two main reasons: the repeated blows suffered, first from a distance and later in the melée, and the signs of overkill.

REN30 is represented by an isolated skull of an adult male that displays an antemortem sub-circular shaped blunt force trauma on the right parietal eminence (*1 Cranial Wound*, fig. 19).



Fig. 19. REN30.



Fig. 20. REN32.



REN32 is an adult male 170 cm tall weighing 62 kg. Two perimortal lesions caused by a downward blow are located on the skull (fig. 20). The first one (*1 Cranial Wound*) is a long penetrating injury on the anterior portion of the right parietal and on the right posterior part of the frontal bone. It crosses the *pars complicata* of the coronal suture in the antero-posterior direction, just above the sphenofrontal suture, and it ends just a few millimeters behind the temporal ridge. The upper margin of the lesion contains a slightly lifted part due to the





Fig. 21. REN33 ind1.

elastic reaction of the hydrated tissues. The second injury (*2 Cranial Wound*) is located on the right side of the occipital, temporal and parietal bones and it is a 112 mm long full-thickness blade cut. The two wounds may have been inflicted in the same occasion in an overkill scenario when the victim was probably on the ground – a typical war battle.

REN33 ind1 is a skull belonging to an adult, probably male, with signs of *cribra cranii*. There is a perimortem lesion on the left parietal bone (*1 cranial wound*) caused by a downward cut from right to left. It was likely caused by an enemy placed behind the victim and with a weapon probably similar to an axe (fig. 21). Again, it may have occurred during a battle scenario in which the victim was hit from behind.

REN34 indA is a young male (15-16 years) whose skull was not found. The postcranial skeleton is affected by thirteen blows, all perimortem (fig. 22⁴). The left scapula has two blade lesions (*1-2 Postcranial wounds*) located on the acromion process, at the insertion of the deltoid muscle, very close together. The first injury is arch-shaped and the second one has an irregular shape. Other six blade lesions are located on the left humerus: four are located on the lateral margin of the proximal and medial part of the diaphysis, one above the other (*3-6 Postcranial wound*). They all have an oval shape with a smooth upper portion

⁴ Pictures of this skeleton are not attached due to the unavailability of the old samples.

and a rough lower one with removal of bone layer. Two other blade injuries have the shape of an incision and are located on the lateral margin of the proximal part of the diaphysis (7-8 Postcranial wound). On the right femur there are two blade injuries, one on the lateral margin of the medial third of the diaphysis (9 Postcranial wound) and the other one on the front at the base of the neck (10 Postcranial wound). On the left femur there are two other lesions (11-12 Postcranial wounds) in the lateral part of the distal epiphysis. The last injury is visible on the lateral margin of the proximal third of the right tibia with a smooth upper



Fig. 22. REN34 indA.

part and a rough lower one (*13 Postcranial wound*). All these injuries were inflicted with a long-bladed weapon, such as a sword. Those on the arm and on the left side of the thigh were inflicted with downward blows from right to left. Those on the right leg were caused by downward blows from left to right. The overkill, distribution and number of blows suggest the subject's violent death occurred in a battlefield, while he was lying helplessly on the ground.

REN35 indA is an adult male. The skeleton is robust and used to be very muscular. He was 170 cm tall and weighed 75 kg. The skullcap shows mild signs of *combed hair*, similar to the early stages of vitamin C deficiency. The right parietal bone has an old blunt force trauma (fig. 23). The injury (*1 Cranial wound*) has an elliptical shape and seems to have been caused by a weapon such as a club, probably with a downward blow from left to right either by an enemy standing in front of or slightly to the right side of the victim.

REN35 indD is an elderly adult of unknown sex. He was buried together with the previous individual. The skull shows two perimortem downward cuts and an old blunt force trauma (fig. 24). The first cut (*1 Cranial wound*) is located on the central part of the occipital squama and consists of a full-thickness vertical wound with an ellipsoidal shape. The second one (*2 Cranial wound*) is located on the frontal bone and consists of a horizontal cut between the upper edges of the orbits. The two blade injuries were caused by a long-bladed weapon such as a sword. The first injury was a blade lesion from right to left by an enemy

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Fig. 24. REN35 indD.



Fig. 25. REN39 indA.

placed behind the victim, the second one with a blow from left to right inflicted by an enemy standing in front of the victim. It is likely that the frontal blow was the initial one, followed by the cut on the occipital. The last cranial blunt force trauma (*3 Cranial wound*) is located on the left parietal, near the *pars obelica* of the sagittal suture. It was probably inflicted by a weapon similar to a club by an enemy on the left side with a downward blow from right to left.

REN39 indA is probably a female adult, 169 cm tall, with two perimortem cranial blade wounds (fig. 25). The first is located in the central part of the squamous part of the frontal bone (*1 Cranial wound*), while the second one, more superficial, is on the right parietal bone (*2 Cranial wound*). The weapon is not identifiable and both blows are related to an unknown incident of violence, where the enemy inflicted a downward blow from right to left.

REN41C indA is an adult male of 165 cm and has signs of *combed hair* on the cranial vault (Cargill 2014). An old triangular blunt force trauma (*1 Cranial wound*) is located on the posterior left portion of the frontal bone (fig. 26). The blow scenario may have been an episode of interpersonal violence where the enemy inflicted a downward blow from right to left with a blunt object similar to a club.

REN43C indB is a 20-25 year-old woman, 164 cm tall and weighing 72 kg. *Cribra orbitalia* are present on the orbital roof while the postcranial skeleton was not very muscular. On the skull, there are four old blunt force traumas and three



Fig. 27. REN43C indB.

perimortem wounds (fig. 27). The blunt force injuries are small and oval shaped (*1-4 Cranial wounds*). On the frontal bone there are three injuries: one on the right side and two close to each other on the left side. The last injury is on the right parietal bone. The blunt weapon that caused these fractures is unclear. The first blade wound – a transverse cut – (*5 Cranial wound*) is on the left posterior side of the frontal bone. In addition, there are two other injuries (*6-7 Cranial wounds*) on the left parietal bone close to the left parietal eminence. They are superficial



Fig. 28. REN45C indC.

and parallel to each other and have a transversal direction. The stab wounds have no signs of healing and were caused by an unidentified blade. The wounds may have been caused by ongoing mistreatments and abuse, probably as a result of domestic violence.

REN45C indC is a 40-44 year-old male, 167 cm tall and weighing 74 kg. He suffered from hernias, unilateral sacroiliitis on the left side and reactive arthritis (Reiter syndrome). He suffered os acromiale on the left scapula; the skeleton is strong and with visible entheses. The skull shows five perimortem lesions - three caused by downward cuts and two puncture wounds - and an old blunt force trauma (fig. 28). The first blade wound is located on the central portion of the frontal squama (1 cranial wound). The wound is antero-posteriorly oriented and has two fracture lines transversal to the lesion. One of these lines is anterior and the other is posterior, and they lift a trapezoidal piece of bone (26 x 24 x 43,5 x 17 mm). The blade entered at an angle of 4° from top to bottom and penetrated for 14mm in a transverse direction. The second injury (2 Cranial wound) is a long blade wound that cuts the upper part of the mastoid process, runs through the zygomatic bone and the zygomatic abscess of the left maxilla, and enters the orbit. The third lesion is a penetrating trauma (3 Cranial wound) from the left coronal suture to the acoustic meatus. The last two injuries overlap in a large area damaged by a crushing force. The first lesion is an oval puncture wound on the right temporal bone, above the mastoid process and close to the parietal-temporal suture (4 Cranial wound). Here the projectile pierced the skull at a 45° angle from top to bottom and from behind the victim. The second puncture wound (5 cranial wound) is located between the greater wing of the right sphenoid and frontal bone. It is a postero-anterior lesion that looks like an oblique line going from top to bottom. The supero-posterior part of the lesion is shaped like a little canal while the inferior-anterior part is an oval perforation. The blow was inflicted in a semitangential direction to the diploë surface and the weapon used was also an arrow in a downward trajectory from behind the victim. The antemortem blunt force wound (6 Cranial wound) is located on the left parietal and has a half-moon shape. The injury was probably caused by a weapon similar to a club. The four perimortem blows may have been due to a single violent episode, of which we may have been able to trace its chronological sequence and dynamics, similar to many cases in Towton's battle (Novak 2007). Initially, two arrow wounds to the back may have made the subject dizzy. Then, engaging in a physical fight, he may have suffered a downward blow from right to left with a long blade - e.g. a sword. This blow may have caused the lifting of the skull squama. Later he may have sustained two other mortal wounds, almost one above the other. The first injury, caused by a downward blow from right to left, was lethal and caused the crushing of the skull bones, while the other one may have been inflicted with a middle blow from right to left. Here, the repeated blows, their type and distribution led us to imagine a wartime episode. Another possibility is that the fourth blow came from an arrow shot from behind, and then the victim engaged in a physical confrontation during which he received the downward blow from left to right on the parietal bone, the blow on the frontal bone and then the mortal one on his face - one after the other. It should also be noted that above the area damaged by this last blow there is a loss of bone unrelated to the bones crushing, but derived from another perimortem injury. Finally, the blunt force injury derived from an older violent episode where the individual was hit with an unknown blunt object.

REN48 indC is an adult male (30 years old), 163 cm tall, weighing 68 kg. On the skull there are two puncture wounds that were classified as perimortem because there were no signs of healing (fig. 29). The first is located on the occipital bone, at 10.8 mm behind the bregma. This is an oblique spear-shaped lesion (*1 Cranial wound*), caused by an arrow shot by an enemy standing in front of the victim and on the left side. The second puncture wound (*2 Cranial wound*) is located on the left mandibular ramus and has a quadrangular shape. The wounds may have been caused by weapons like arrows that hit the victim during a battle.

REN50 indD is an adult female. The skull shows an antemortem blunt force trauma and two perimortem blade lesions (fig. 30). The blunt trauma (*1 Cranial wound*) is located on the left side of the frontal squama and has an ellipsoidal



Fig. 29. REN48 indC.



Fig. 30. REN50 indD.

shape. The first blade wound (*2 cranial wound*) is located on the right posterior part of the frontal bone and it crosses the coronal suture in its *pars complicata* with anterior-posterior orientation, and partially overlapping with the second blade wound. This injury (*3 cranial wound*) in fact is located on the medial portion of the right parietal bone with anterior-posterior orientation. In both cases the wedge-shaped mark of the weapon and the rather rough splintering of the bone resulted from an attack with an axe. Both blows can be interpreted as two downward blows from left to right, during a frontal attack.

3.7. Casamassima, Chiesa Matrice (1^{0t}h century AD)

In the apse area of the Chiesa Matrice of Casamassima (BA), a two-level cemetery dating back to the Early Middle Ages with 32 graves was identified during an excavation carried out by the Soprintendenza Archeologica della Puglia in 1996 and 1997. Funerary patterns varied: 12 graves were examined; four were single, three double, five multiple. There was evidence of stacking and reduction of the remains to make room for new individuals. The tombs were affected by the building of the later Romanesque church and for this reason it has not always been possible to excavate the skeletons in full. The individuals, radiocarbon dated (AD 884-1024), are 68 (N.M.I.) – 16 males, 16 females and 36 of unknown sex. Among the pathologies we can highlight five individuals with sternal diseases, two cases of sacral rachischisis, hyperthyroidism, osteomyelitis and os-

Acronym	Sex, age	Bone/ district	Wounds
CAS26uc172	M Mot	Skull, L. Parietal	Blunt (2)
CAGZOUSTIZ	IVI IVIAL	L. Humerus, epicondyle med	Fracture
CAS28us176	M Ad	Skull, R. Temporal	Blunt
CAS28ue180	MAd	Skull, R. Parietal	Sharp
0402003100	IN AU	Jaw	Sharp
CA\$32	EAd	L. Femur	Sharp (2)
UAUUZ		L. Tibia	Sharp (5)
CAS32us217	M Ad	Skull, R. Parietal	Sharp
CAS33us194	M Ad	Skull, L. Temporal	Puncture
		Skull, R. Parietal	Sharp
		Skull, frontal	Blunt
CAS3346106	M Ad	R. Tibia	Sharp (2)
CA35508190		L. Tibia	Sharp (2)
CASus147c	M Ad	L. Femur	Sharp (2)
CASus188A	M Sen	Skull, frontal	Blunt (2)

Tab. 8. Casamassima (BA), Chiesa matrice: list of individuals with wounds.



Fig. 31. CAS26us172.

teogenic sarcoma. In addition, two subjects were identified as being of Sub-Saharan Africa origin by using ancestry assessment models, and a third individual shows skull deformation. Nine individuals showed wounds (Scattarella *et al.* 1998, 1999) that have been reviewed for this article (tab. 8).

CAS26us172 is an elderly male (50-60 years), 178 cm tall and weighing 94 kg whose skeleton is almost complete. Three antemortem wounds, two cranial and one postcranial can be seen (fig. 31). The first cranial wound (*1 Cranial wound*) is a blunt force trauma and has a sub-circular shape. It is located on the





Fig. 32. CAS28us176.

left parietal bone. The second cranial wound (*2 Cranial wound*) has the same features and is located on the *pars obelica* of the sagittal suture. The medial epicondyle of the left humerus is fractured with a pseudoarthrosis outcome (*3 Postcranial wound*). The blows on the skull were most likely inflicted during an act of interpersonal violence – the enemy, placed behind the victim, struck two downward blows from right to left with a blunt object such as a stick or a club. The lesion on the left elbow could be attributed to a frontal blow received while the victim's arm was abducted and his forearm flexed and pronated, as to protect his face. The blows may have been inflicted in one or in several events that happened before the individual's death. One of these blows may have even caused a deviated nasal septum to the left.

CAS28us176 is an adult male, represented only by his skull. On the left parietal bone (*1 Cranial wound*) there is an old blunt wound of ellipsoidal shape (fig. 32). The lesion resulted from a downward blow from left to right from an enemy placed behind the subject, when he was probably on the ground with his head turned left.

CAS28us180 is an adult male (40-44 years) placed in the same grave as CAS28us176 individual. Two blade injuries can be seen on the skull (fig. 33). The first (*1 Cranial wound*) is an antemortem full-thickness wound on the right parietal bone. It has a half moon shape with the medial margin cutting the *pars lambdica* of the sagittal suture. One part of the lower margin is smooth and cone shaped,



Fig. 33. CAS28us180.

while the other part of the lower side as well as the lateral margin show a rough surface. Finally, the upper margin is missing – as well as the entire cranial vault. The second injury (*2 Cranial wound*) is a line located on the left mandibular branch at the base of the coronoid process. A long-bladed weapon such as a sword was used for both injuries. The blows were caused by an enemy placed behind the victim inflicting a downward blow from left to right to the back of the victim's neck while he was lying face down. In the first case the blade entered from the bottom up with a trajectory of about 9° toward the surface of the skull. In the second injury the enemy was in front of the victim and hit from right to left, either a downright blow or a horizontal cut, depending on the unknown position of his head.

CAS32 is an adult male whose only remains are the bones of his left leg. There are seven lesions, all blade perimortem wounds – two on the femur and five on the tibia (fig. 34). On the *linea aspera* of the femur, at the level of the third distal of the diaphysis, there is a triangular cut (*1 Postcranial wound*). The lesion also shows triangular splintering at the top. There is a second blade wound



Fig. 34. CAS32.

below this one (2 Postcranial wound), which also has irregular shaped splintering at the top. The five injuries on the tibia are all located on its middle third. On the medial surface there are two superficial cuts, and it is not possible to determine the entry angle of the blade (3-4 Postcranial wound). On the medial surface there is also a wider lesion (5 Postcranial wound). Moreover, the posterior surface displays two perimortem lesions - the first is deep (6 Postcranial wound) while the second superficial (7 Postcranial wound). The blows are related to an armed combat where the enemy hit the individual with a long-bladed weapon, most likely a sword. The enemy probably first hit the tibia with two upward blows from right to left and then, coming down harder on the victim, hit the femur with two blows executed with the same weapon while he was lying face down.

CAS32us217 is a male adult with few bone remains. On the right parietal bone there is a large downward blow wound (1 Cranial wound) with perforation, shaped like a leaf, found at the centre (fig. 35). The blade penetrated into the bone with a trajectory of 59° from top to bottom. The wound edges have been cleaned and the CAT scan showed bone regrowth. This is evidence of the individual's survival after the traumatic event and allows us to classify the lesion as antemortem. The wound was caused by a sword with a downward blow from right to left by an enemy placed at the victim's back.





Fig. 35. CAS32us217.

CAS33us194 is a male adult with some cranial features that recall the 'paleonegrid' type: the nasal bones are large and flattened and form a 'Roman arch', the piriform opening is very wide even on top, and the lower margin has a nasal alveolar *clivus*, with a diastema between P1 and C. In addition, the jaw is stubby and chinless, the skull is chamaerrhine, and shows prognathism. Three lesions are present (fig. 36). The first is a full-thickness puncture wound (1 Cranial wound) that can be seen on the posterior portion of the left temporal squama and has a sub-elliptical shape. Ectocranially, there is a small crack located on the superior margin of the lesion, while endocranially the crack is located on the inferior margin. This indicates that the projectile entered into the skull from top to bottom. On the posterior portion of the right parietal bone there is a superficial, half-moon shaped blade wound with anterior concavity (2 Cranial wound). Finally, the third injury is a blunt wound (3 Cranial wound) located on the medial portion of the frontal bone and has a sub-circular shape. The puncture wound in particular is compatible with the cause of death - a trauma caused by the tip of an arrow that, coming from the top with a curving trajectory, hit the subject on the left side of the skull. The blunt and blade wounds prior to the subject's death are rather dubious: the blade wound in particular could be interpreted as an incision done for therapeutic purposes. Other lesions have been identified on the subject, but they cannot be inserted into any study category due to the skull conservation status.



Fig. 36. CAS33us194.

CAS33us196 is an adult, most likely a male, represented only by his tibial bones. There are four perimortem blade wounds, all on the middle third of the tibial crests (fig. 37). On the left diaphysis, the first lesion (*1 Postcranial wound*) is a deep triangular cut while the second is a very superficial lesion (*2 Postcranial Wound*). However, two small lesions are present on the right diaphysis (*3-4 Postcranial wounds*), one of which has a triangular-shaped splintering at the top. During armed combat, the enemy probably hit the individual with a long blade – a sword – with two upward blows from left to right on the left tibia, probably in a close chronological succession; then he furiously hit the right tibia, when the victim was by then on the ground.



Fig. 37. CAS33us196.



Fig. 38. CASus147c.

CASus147c is an adult, probably male, and only the left femur is preserved. There are two perimortem blade wounds on the distal epiphysis, one on the popliteal surface and the other above the lateral condyle (fig. 38). The first one (*1 Postcranial Wound*) has a triangular shaped splintering at the top of the lesion, unlike the second one (*2 Postcranial Wound*). The injuries may have been the result of the enemy's repeated blows with a long-bladed weapon, such as a sword, on the subject's left side while the victim was lying face down.



Fig. 39. CASus188A.

CASus188A is the skull of an elderly male. Two perimortem blunt force traumas can be seen on the frontal bone. The fracture lines extended in the posterior direction (fig. 39). The first blunt trauma (*1 Cranial wound*) is located in the central part of the frontal bone and has a sub-circular shape. The second (*2 Cranial wound*) is located on the right part of the frontal bone and is drop-shaped. Two downward blows were inflicted from left to right, using a weapon that cannot be determined while the subject was in front of the enemy. In particular, a greater concavity on the right side of the second injury may be the result of a blow from a different angle.

4. Results and discussion

In the biological profile of all the individuals examined, with the exception of San Giusto, the age range varies from juvenile to elderly, whilst in Casamassima there are no young people. The subjects are all male, with the exception of the samples of Monopoli – two women (REN43/C indB and REN50 indD) – and Casamassima – one case (CAS32).

Type of lesion	N.	N.%
Sharp	2	20
Blunt	3	30
Puncture	5	50
TOTAL	10	100

Tab. 9. Lucera (FG), San Giusto and Ascoli Satriano (FG), Faragola: type of lesions.

Weapons	N.	N. %
Sword	1	10
Axe	0	0
Sax (Lang)	0	0
Knife	0	0
Big weapon, undetermined	0	0
Arrows	4	40
Bat	3	30
Dolabra	2	20
TOTAL	10	100

Tab. 10. Lucera (FG), San Giusto and Ascoli Satriano (FG), Faragola: type of weapons.

The data of the recorded injuries regarding the individuals under examination were subjected to statistical analysis on a geographical basis. The remains of San Giusto can be connected to the only individual coming from the Roman villa of Faragola (tab. 9-10, graph. 1-2). The traumas and lesions examined were those of male whose death occurred at a young age or in adulthood. Documented lesions are 10 with a per capita incidence of 1.7. In the skeletal series, puncture wounds (50%) are particularly frequent, followed by blunt force traumas (30%); whereas the blade wounds (20%) are less recurrent. The head appears to be the most affected anatomical region for a total of 9 blows, distributed mainly on the front and on the right side. Only once a body was hit on the legs with a single puncture wound. Ranged weapons, probably arrows, were mostly responsible for physical injuries (40%), followed by trauma and melee weapons like clubs (30%), and finally dolabra (20%) and spatha (10%). This framework and the absence of injuries caused by overkill, are not enough to support the hypothesis that the individuals of this sample were involved in real war events, but rather in small skirmishes or ambushes. The individual from Faragola deserves a separate evaluation: nasal bones have repeated fractures attributable to receiving continuous blows. Furthermore, the fifth metacarpal of the right hand shows the outcome of a fracture that has caused a morphological shortening and alteration of the bone itself. Blows on the nose are common in boxing competitions and are caused by punches thrown by an aggressor attacking from the front as well as the injury to the fifth right finger are typical wounds of a right-hand boxer that attacks or defends himself. The typology and distribution of the blows suffered as well the context support the hypothesis of frequent involvement in vio-



Graph. 1. Lucera (FG), San Giusto and Ascoli Satriano (FG), Faragola: distribution of the cranial lesions.



Graph. 2. Lucera (FG), San Giusto and Ascoli Satriano (FG), Faragola: distribution of the postcranial lesions.

lent episodes, such as bare hand combat. Another individual, the CSP4 subject from the San Pietro a Canosa site, is a similar case. Again, there are repeated fractures on the nasal bones and on the second left rib, and rupture of the collateral ligament of the left knee. In addition, the zygomatic processes of the frontal bone reveal a chronic cortical alteration in the form of a strongly cribrous and coarse area. Finally, the maxillary frontal teeth show atypical half moon shaped wear, related to the use of teeth in craft, handling activities. Both cases, but in particular the CSP4 framework, refer to the boxer's figure, though from earlier times (Capasso 2001, pp. 172-183) (fig. 40) – repeated blows on the nose were the result of punches received enemy attacking from the front, the one at the second rib is due to downward blows. In addition, the cortical alteration of the zygomatic processes of the frontal bone may be the consequence of skin and skeletal inflammation, which was the result of mechanical irritation due to ha-



Fig. 40. Boxing injuries: nose fracture (1), markers on the teeth (2) and fracture of the fifth metacarpal (3).

bitual use of very adherent and protective headgear. Finally, abnormal dental wear could be caused by the habit of ancient wrestlers to roll up the leather glove strings that often came loose during combat with their teeth, as evidenced in vascular (eg. Antimenes Painter's Attic black-figure amphora, Metropolitan Museum of Art, New York City; black-figure Panathenaic amphora, British Museum, London, UK) and statuary iconography ('The Resting Boxer' of Lisippo, Roman National Museum, Rome, Italy) of the 4th century BC.

In Canosa, the traumatized individuals in most cases come from San Pietro, others from Piano San Giovanni and the Baptistery – they are all male whose death occurred at a young age or in adulthood (tab. 11-12, graph. 3-4). Individ-

Type of lesion	Ν.	N.%
Sharp	17	65
Puncture	5	20
Blunt	4	15
TOTAL	26	100

Weapons	N.	N. %
Sword	10	38.5
Axe	1	3.8
Sax (Lang)	2	7.7
Knife	3	11.5
Big weapon, undetermined	1	3.8
Arrows	5	19.3
Bat	4	15.4
Dolabra	0	0
TOTAL	26	100

Tab. 11. Canosa (BT), Piano San Giovanni, Baptistery and San Pietro: type of lesions.

Tab. 12. Canosa (BT), Piano San Giovanni, Baptistery and San Pietro: type of weapons.



Graph. 3. Canosa (BT), Piano San Giovanni, Baptistery and San Pietro: distribution of the cranial lesions.



Graph. 4. Canosa (BT), Piano San Giovanni, Baptistery and San Pietro: distribution of the postcranial lesions.

uals display a total of 26 injuries, approximately 3 head injuries each. The ones most frequently revealed are blade wounds (71.5%), followed by puncture wounds (17.8%) and blunt wounds (10.7%). The most affected anatomical region is the skull (87.6%), with a total of 22 lesions distributed as follows: 16 frontal and 6 posterior, 7 on the left side and 15 on the right. The prevalence of lesions located on the front and right side of the victim may indicate downward blows from left to right and blows from right to left inflicted latero-posteriorly. The post-cranial skeleton shows injuries in 21.4% of cases – blade wounds are frequent, especially in the upper part of the body, and the only puncture wound is located at the tibial level. The most common weapons were bladed ones, such the *spatha* (46.4%), used in a case of overkill. For the first time here there are physical in-

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Type of lesion	N.	N. %
Sharp	34	64.1
Puncture	6	7.7
Blunt	11	28.2
TOTAL	51	100

Tab. 13. Monopoli (BA), Palace Rendella: type of lesions.

Weapons	N.	N. %
Sword	33	64.7
Axe	2	4
Sax (Lang)	0	0
Knife	0	0
Big weapon, undetermined	0	0
Arrows	4	7.8
Bat	12	23.5
Dolabra	0	0
TOTAL	51	100

Tab. 14. Monopoli (BA), Palace Rendella: type of weapons.



Graph. 5. Monopoli (BA), Palace Rendella: distribution of the cranial lesions.

juries related to the use of a single edge blade, probably a long *sax*, while impact and ranged weapons are less important compared to San Giusto's site (10.7% and 17.8% respectively). This incidence, along with a single case of overkill, might suggest the same theory hypothesised for the individuals found in San Giusto – they participated in skirmishes or ambushes and not in actual battles.

The Early Medieval sample discovered at Monopoli's Cemetery is composed of 10 males, 3 females, and an individual whose sex is unknown. Death occurred at either a young age or in adulthood (tab. 13-14, graph. 5-6). The number of injuries *per capita* is almost four. Individuals show a total of 51 injuries – blade wounds (66.7%), followed by blunt wounds (21.5%) and puncture wounds



Graph. 6. Monopoli (BA), Palace Rendella: distribution of the postcranial lesions.

(11.8%). The most affected anatomical region is the skull with 38 blows (70.6%), especially blade injuries (19), followed by trauma (11) and puncture wounds (6). The most targeted areas of the head are the front and the left side. This incidence supports the hypothesis of blows executed from right to left, presumably by enemies placed in front of the victims. The postcranial skeleton shows 15 blade wounds, mainly directed at the upper and lower extremities – repeated blows are also frequent. The *Spatha* or sword is the most used weapon (62.7%), followed by blunt weapons such as maces or clubs (21.6%), while axes (3.9%) are less frequent, as are ranged weapons like arrows (11.8%). The presence of multiple traumas, horizontal blows (middle blows from right to left, and from left to right) and the overkill supports the hypothesis that the individuals found in Monopoli may have been involved in a proper battle.

The cemetery located in the area of the apse of the Chiesa Matrice of Casamassima is the only one dated to C14 (884-1024 AD) but it is isolated as few excavations have been carried out in this town. The anthropological and paleopathological study refers to male individuals whose death occurred either in adulthood or at an older age (tab. 15-16, graph. 7-8). The number of injuries per capita is 3. The individuals recovered from the Casamassima cemetery show a total of 24 injuries – blade wounds (66.7%), followed by blunt wounds (29.1%) and puncture wounds (4.2%). The most affected anatomical region is the postcranial skeleton (58.3%): blunt force trauma occurred at the upper limb level, while 13 downward blows are located on the leg bones. These are important injuries inflicted from the bottom up (upward) with repeated blows. They were caused by a long-bladed weapon, probably a *spatha* inflicted by an enemy who hit the victim repeatedly. Moreover, they were followed by overkill blows inflicted with the same weapon when the subject was on the ground. Regarding

Type of lesion	N.	N. %
Sharp	16	69.6
Puncture	1	4.3
Blunt	6	26.1
TOTAL	23	100

Tab. 15. Casamassima (BA), Chiesa Matrice: type of lesions.

Weapons	N.	N. %
Sword	16	66.7
Axe	0	0
Sax (Lang)	0	0
Knife	0	0
Big weapon, undetermined	0	0
Arrows	1	4.2
Bat	7	29.1
Dolabra	0	0
TOTAL	24	100

Tab. 16. Casamassima (BA), Chiesa Matrice: type of weapons.



Graph. 7. Casamassima (BA), Chiesa Matrice: distribution of the cranial lesions.

cranial lesions, the front and back portions are equally affected, with a predominance on the right side, indicating blows coming from multiple directions. The only blade used was a *spatha* (66.7%), but there are signs of blunt weapons, such as maces or clubs (29.3%), while ranged weapons such as arrows (4%) were less frequently used. The most likely scenario may have been an ambush for several reasons – repeated and upward blows, possibility that the subjects in the study turned their backs on their enemies, perhaps during a hasty escape, as well as the location of the blows on the skull, not on the left frontal side, which is were they are usually found after an armed fight.



Graph. 8. Casamassima (BA), Chiesa Matrice: distribution of the postcranial lesions.



Fig. 41. Type of lesions: blade (1a-b), blunt (2) e puncture (3).

Another statistical survey was performed on a chronological basis, splitting the sites into two macro periods of time: Late Antiquity (San Giusto, Faragola and Canosa cemeteries) from 400 to 700 AD; and Early Middle Ages (Casamassima and Monopoli) from 700 to 1000 AD. Comparison between the two groups allows us to assess the temporal trend of the types of lesions (fig. 41, tab. 17, graph. 9).

	L	A	MA		ТОТ	
% Lesions	С	PC	С	PC	С	PC
Sharp	44.5	11.1	32.0	34.7	36.1	27.0
Blunt	19.4	0	22.7	1.3	21.6	0.9
Puncture	22.2	2.8	9.3	0	13.5	0.9

Tab. 17. Type of lesions between Late Antique (LA) and Early Middle Ages (MA) on a cranial (C) and postcranial level (PC).



Graph. 9. Distribution of cranial and postcranial trauma between Late Antiquity and Early Middle Ages.

Lesions at the cranial level in Late Antiquity resulted mainly from bladed weapons, traumas are about a fifth of the total injuries, puncture wounds have a certain importance, while post-cranial injuries are marginal. In the Early Middle Age samples, instead, the skull was mainly hit by melée weapons and blades and the postcranial injuries became more frequent, inflicted with bladed weapons. The blunt force traumas occurred approximately at the same frequency as those of the previous period while arrow wounds lost importance. Therefore, the injuries inflicted in both periods of time were mostly bladed wounds (63% of injuries), followed by traumas (22.5%) and puncture wounds (14.4%). In all cases, the skull is the main target of injury (71%) (fig. 42) although the skull can better preserve the perimortal lesions than the rest of the body which suffers major fractures, often making it extremely difficult to recognize these wounds.

The examination of the lesions allowed the identification of the possible weapons used. They can be weapons used in hand-to-hand combat, ranged weapons, and, in some cases, improper weapons like work tools. In the latter case, at least 8 types of weapons were used (tab. 18), mostly blades (62% of the cases studied). In the Late Antiquity sample we can identify the *spatha* (30.6%)



Fig. 42. 'Seven swords diagram' modified from *Flos duellatorum* (Pisani-Dossi MS, fol. 17A, 1409-10) and dynamics: downward blow from left to right (1), downward blow from right to left (2), middle blow (3) and upward blow (4).

Weapon	LA		MA		LA+MA	
Weapon	N.	N.%	N.	N.%	N.	N.%
Sword	11	30.6	49	65.3	60	54
Bat	7	19.5	19	25.3	26	23.4
Arrows	9	25.0	5	6.7	14	12.6
Axe	1	2.8	2	2.7	3	2.8
Knife	3	8.3	0	0	3	2.7
Sax	2	5.5	0	0	2	1.8
Dolabra	2	5.5	0	0	2	1.8
Big weapon, undetermined	1	2.8	0	0	1	0.9
TOTAL	36	100	75	100	111	100

Tab. 18. Types of weapons between Late Antique (LA) and Early Middle Ages (MA).

of lesions), axe (2.8%) and sax (5.5%), probably an elongated type (*langsax*). The use of a large and heavy weapon (2.8%), probably similar to an axe, is also documented. Occasional weapons include a knife (8.3%) and probably the *dolabra* (5.5%). Some blunt weapons are not completely identified, such as maces or clubs (19.5%), and ranged weapons such as arrows are documented in 25% of cases. In the Early Middle Ages sample, instead, the use of bladed weapons such as the *spatha*/sword is more frequent (54% of the cases), while

the axe remains rare (2.8%). Clubs are used more or less with the same frequency (23.4%) of the previous sample, while ranged weapons are less frequently used (12.6%). However, considering both periods, long blade weapons are dominant, such as spathae and later swords, or melée weapons with long straight double-edged pointed blades. Between Late Antiguity and Early Middle Ages large-bladed weapons were common - they were double-edged, with a pointed shape and wide fullers. The handles of such weapons hardly protected the fighter's hand and for this reason with the passing of time people started to build bigger hilts. At the same time, the blades tended to decrease their width and increase the sharp profile of the tip, following a trend that will continue throughout the Late Middle Ages. The signs created by triangular or spearshaped tips were caused by arrowheads. Considering the historical period and the geographical scope, there is still no specific use for arrows: the arrowheads could have been used for hunting or war without distinction, and the profile of the tip was spear-shaped with possible barbs at the terminal (like a broadhead). In the Late Middle Ages, instead, the tips of the arrowheads for war use, aimed at penetrating the metal armours, is conical or pyramidal (Sogliani 1995, pp. 105-106; De Vingo et al. 2001; Piuzzi 2003, pp. 98-101, 119; Natati, Telleri 2006).

The hypothesis for the identification of two specific weapons, the *sax* and the Byzantine *dolabra* is particularly interesting. The first, a large knife used by Germanic people, was probably used at the site of San Pietro in Canosa in its most ancient form – *scramasax* or *scramasaxus* (Gregorii Turonensis IV, 51) – a compound term which literally means 'big knife' (*sax*) and 'wounds' (*scrama*). There are different versions of this weapon such as the *langsax* which was longer, typically used in a war scenario because of its long blade (Csiky 2012, p. 375) or the *kurzsax*, which was shorter and useful as a work tool (Csiky 1979). In one case (SG130) a pickaxe might have been used, an object similar to the *dolabra* or *dolabella*, common in Roman armies (and perhaps Byzantine too) as a work tool in the fields or for religious sacrifices.

The statistical study was followed by a study and summary of the general historical context. During the Late Antiquity period important changes occurred particularly in Italy and Apulia from an anthropological and cultural point of view – the fall of the Western Roman Empire, the arrival of the Barbarians, Apulia's territorial annexation to the province of Byzantium and the demographic expansion of Slavic peoples from Central Europe towards the imperial Balkan territories. These factors caused the introduction of a gene flow from Northern and Eastern Europe. In particular in the northern part of the region during the Greek-Gothic War (535-553 AD), according to different sources (Ammianus Marcellinus, Jordanes, Procopius of Caesarea), foreigners were employed as mercenaries by imperial armies. Their presence is likely to be connected to the Longobards, who arrived later in the Italian peninsula (568 AD) and were territorially close and allied with the Avars of Pannonia (Kiszely 1979). The presence of foreigners in these territories is also documented later in the Dukedom of Benevento, the southern part of the Longobard Kingdom – which now consists of Molise and the northern part of Apulia. According to Paul the Deacon, the title of gastald was bestowed upon the Bulgars' chief, Alcek (or Altzek) by Duke Romualdo. His clan carried out hydraulic works and shepherding, but its people was also likely used as mercenaries - the tombs of warriors with horses in Vicenne Campochiaro dating to the same period prove it (Giusberti 1991; Genito 1998; Arslan 2000; Ceglia 2000; Tufarulo 2007; Ceglia, Marchetta 2012; Provesi 2010). The presence of Central Asian and Mongolian individuals has already been confirmed archaeologically and anthropologically in the North of Apulia, precisely in Canosa - at the sites of San Pietro (Sublimi Saponetti 1991) and Piano San Giovanni (Sublimi Saponetti et al. 2005) - and in Lucera - at the site of San Giusto (Sublimi Saponetti et al. 2009). Some of those individuals had injuries on their skeleton, resulting from unrestrained interpersonal violence. The numerous arrow wounds amongst the individuals in San Giusto cemetery in Lucera are star-shaped and may have been caused by the Avaricum 'three-wings' arrows like those found in graves 85 (Ceglia 2000, pp. 216-22) and 150 (Ceglia, Marchetta 2012, p. 228) in Vicenne Campochiaro. The injuries of the individuals in San Giusto may have been linked to two data. The first is the alleged passage on the site of lohannes, general of the Byzantine imperial army (Volpe 2002, pp. 89-93), and the second is the discovery of a guiver with war arrows of the same type in a tomb of the funerary Basilica of San Giusto (De Santis, Giuliani 1998, pp. 230-232). The emerging picture suggests the presence of archers on horseback during this period. perhaps referring to the Greek-Gothic War. These subjects also appear to be the potential assailants in the case of the decapitated and scalped individuals in San Pietro at Canosa (CSP53) and as protagonists in the case of the Battistero di San Giovanni (BSG1).

In the Early Middle Ages, the region was the scene of continuous clashes due to the Saracen raids, which began in the 8th century and lasted until the end of the 10th century. The most important city of the region in those years, Bari, became a proper emirate (847-871) and during the reign of Mufarrag Ibn Sallam (852-853), the Arab conquest also extended to the surrounding territory. However, the city was later retaken by the Longobards and Byzantines (876). Archaeologically and anthropologically, individuals with Berber and Negroid features are found starting from this period of time. In fact, in Casamassima there are some individuals showing morpho cranial features typical of the sub-Saharan African populations. At that time there were numerous sieges and battles: however, from an archaeological point of view, there is no evidence regarding the exact location of the cemeteries of those who died during these events. To further complicate matters, multiple tombs were common, reducing old burials and reusing the graves, effectively preventing the reassembling of full skeletons and their precise dating. Nevertheless, it is possible to place individuals from the Casamassima (Chiesa Matrice) and Monopoli (Palace Rendella) sites in this context of continuous war and lack of social security. In the first case, individuals seem to have been caught up in a proper ambush given the numerous cranial lesions inflicted posteriorly as well as the upward blows on the legs. In the Monopoli samples, however, both downward and middle blows inflicted anteriorly and on the left side as well as repeated blows are widespread. The individuals were probably involved in a battle, as it would happen in a proper war episode or in one of the sieges that befell the city (given the presence of female subjects). Monopoly suffered several sieges in those years: in 965 it was attacked by Arabs from land and sea, but it was not conquered thanks to the involvement of the Venetian Schiavoni family. Later, in June 1042 it was besieged and conquered by Byzantine General Giorgio Maniace, and finally in 1049 the Norman Hugo 'Toute-Bone', after a long and fierce siege, conquered the city.

5. Conclusion

This study made it possible to systematically analyse the traumatology recorded on the bones of a sample from Apulia (Italy) between the Late Antiquity and Early Middle Ages. For the Late Antique period, in San Giusto and Faragola the individuals show injuries like punctures and blunt force traumas (arrows and clubs), mainly to the head, in single events of interpersonal violence, an exception being the "boxers" of Faragola and San Pietro. The examined individuals found in Canosa were mainly victims of cutting blows, especially on the skull, inflicted by bladed weapons during single fights probably not related to a battle. For the Early Middle Ages there are samples of both male and female individuals in Monopoli, with cutting and blunt injuries both in the skull and on the long limbs, especially the legs, caused by weapons such as *spathae*, clubs and axes in a scenario that would seem like a proper battle with episodes of overkill. The Casamassima cemetery also hosted individuals hit both in the skull and in the postcranial skeleton with repeated blows on the bodies as the individuals were on the ground, as in an ambush. Unlike the previous era, the injuries to the skull caused by melée weapons and blades are accompanied by cutting traumas to the body, while pointed weapons are less frequent.

While it is easier to recognize the type of weapon, it is more difficult to precisely identify which one was actually used – we assume the use of bladed weapons such as *spatha*, blunt weapons such as clubs and maces and pointed weapons such as arrows, but we also suggest the presence of a Germanic *sax* and a Byzantine *dolabra*. The sample studied represents a young and adult population, mainly male, with the exception of the women recovered in Monopoli. A population that was familiar with violence, and used weapons that reflected the historical context as well as the cultural influences of the people that dominated the territory. In fact, during the Late Antique period, this region witnessed the Greek-Gothic war and the Byzantine and Longobard domination but also the influx of Central Asian populations, while in the early Middle Ages it was a land of raids and assaults.

Recorded data reveals considerable potential for interpersonal trauma between the Late Antiquity period and the Early Middle Ages in Apulia: from skeletal testimony, it is possible to identify weapons (proper and improper), reconstruct their use, hypothesize combat mode and attempt to reconstruct the context in light of the historical framework. The results represent the first extensive database for the study of paleo-traumatology in Apulia between Late Antiquity and the Early Middle Ages and opens new perspectives toward a similar study in other geographical and chronological frameworks.

Abstract

This paper analyses the skeletal remains with signs of violence coming from some archaeological sites located in Apulia (Southern Italy) and dated between Late Antiquity and the Early Middle Ages. The research is based on historical, archaeological, anthropological and paleopathological sources and aims to determine the nature of the detected injuries. The careful recording and statistical analysis have enabled the observation of their distribution on the bones, hypothesize the weapons used, as well as reconstruct how injuries were inflicted and pinpoint any elements and cultural influences. In particular, a data registration model has been developed; if accepted by the scientific community, it would allow a homogeneous recording and database, useful for the study of traumas in different geographical and chronological contexts. The findings have been interpreted based on the historical events of the region and they represent the first extensive database for the study of paleotraumatology in Apulia in this historical period.

Keywords: injuries, violence, weapon, lesions, Late Antiquity, Middle Ages, Apulia.

Il presente lavoro riguarda lo studio dei resti scheletrici di alcuni campioni provenienti dalla Puglia (Sud Italia) in un arco cronologico compreso tra il Tardo Antico e l'Alto Medioevo che recano segni di violenza. La ricerca si basa sulle fonti storiche, archeologiche, antropologiche e paleopatologiche e mira a determinare la natura di queste lesioni. La schedatura e l'analisi statistica hanno consentito di osservarne la distribuzione in base al distretto scheletrico, di ipotizzare la possibile arma utilizzata, di ricostruire la dinamica della violenza e di riconoscere eventuali influenze culturali. In particolare attraverso la schedatura il lavoro propone un modello di registrazione dei dati il più completo e affidabile possibile che, se condiviso dalla comunità scientifica, consentirebbe di ottenere una banca dati omogenea per lo studio dei traumi di diversi contesti geografici e cronologici. I risultati sono infine interpretati in riferimento alle vicende storiche della regione e costituiscono la prima e ampia base di dati per lo studio della paleotraumatologia della Puglia tra il Tardo Antico e l'Alto Medioevo.

Parole chiave: ferite, violenza, armi, lesioni, tarda antichità, medioevo, Puglia,

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