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Traumatic Events and Life-Style in Ancient Italian Populations

Patricia Brasili, Enrica Bianchi and Angela Raffaella Ventrella

Department of Experimental Evolutionary Biology, Anthropology Unit, University of Bologna, Bologna, Italy

A B S T R A C T

Traumatic lesions are commonly found in archaeological skeletal samples and provide useful information about various behavioral and cultural aspects of the populations. Our aim was to evaluate the relationship between the distribution and types of skeletal traumatic lesions and the different life-styles of past populations. We examined three necropolises in central Italy. Pozzilli (VI–IV century BC) and Quadrella (I–IV century AD) are from the same geographical area (Molise) but belong to different periods; Novilara (IX–VI century BC) is located in Marche but belongs to the Iron Age like Pozzilli. The lesions observed at Pozzilli seem not to be accidental, whereas the traumas observed at Quadrella can be attributed to occasional, unintentional events. Cranial injuries observed at Novilara strengthen the hypothesis that the population was composed, at least in part, of warriors. Our results suggest the presence of a relationship between skeletal traumatic lesions and life-styles of populations.

Key words: *skeletal material, traumatic lesions, life-style, ancient populations*

Introduction

In the last two decades, traumatic lesions have received particular attention as osteological markers used to reconstruct past life-styles from skeletons[1–3]. This is due to the fact that traumatic lesions are commonly found in archaeological samples and provide useful information about various behavioral and cultural aspects of the populations[4,5]. Indeed the structure, location, conformation and possible degree of repair of traumatic injuries informs us about their etiology, events that might have caused them and possible treatments. Moreover, traumas are cross-cultural phenomena and it is very interesting to investigate how traumatic injuries are patterned within and among human populations[6].

The aim of the present study was to evaluate the distribution and types of traumatic lesions observed in three ancient necropolises of central Italy in order

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to reconstruct the life-styles of the respective populations (Novilara-Pesaro-Marche, IX–VI century BC; Pozzilli-Isernia-Molise, VI–IV century BC; Quadrella-Iserna-Molise, I–IV century AD). Since weapons were found in graves of the Novilara and Pozzilli necropolises, we would expect these two populations to have higher frequencies of injuries attributed to violence than the population of Quadrella, whose grave goods suggest the presence of low social classes and little social differentiation.

Material and Methods

The individuals from Novilara (116 subjects) are attributed to the Picenes. The Novilara material is fragmentary, often with only a few skeletal elements per individual, and the preservation is generally poor. Skulls are best preserved, while there are few postcranial bones. The individuals have Mediterranean characteristics but a high face and slightly above average height, which is typical of actual Marchigian populations. However, the presence of some rather different elements, e.g. a low skull, could be due to the infiltration of groups from nearby regions; in fact, commercial contacts with neighboring populations are well documented[7]. The grave goods indicate that the Novilara population mainly practiced agriculture and livestock-rearing, along with hunting, fishing and craftsmanship. However, Brizio[8] reported the discovery of weapons in graves of males, especially spear points and arrowheads, bronze and iron knives and axes, and the remains of two-wheeled chariots probably used in war. This suggests that warlike activities were also important in this population. In contrast, the graves of females contained almost exclusively ornamental objects. The archaeological specimens indicate a lack of class differences, even though a social division of labor can be hypothesized.

The necropolis of Pozzilli, in the upper Volturno Valley, has only been excavated in part, but has been attributed to the Samnites. The graves are arranged without a precise orientation. The site is not associated with a specific settlement, although the surrounding territory must have had an *oppida* and *castella* situated on high ground to ensure the defense of the community of the *pagus* (Samnite territorial and administrative unit)[9]. The upper Volturno Valley, around the Venafro Plain, was one of the centers of the Samnite defensive system[10]. The grave goods are not particularly rich, but several graves of males contained spear and javelin points, arrowheads, knives, swords and sheaths[11]. The Samnites occupied the internal mountainous zones of today's Molise, in south-central Italy; the geophysical characteristics of the territory and the shortage of resources limited their demographic expansion. Therefore, when the population density approached or exceeded the carrying capacity, there were migrations toward neighboring regions. This produced a certain dispersion of Samnite settlements throughout the territory, but perhaps also the beginning of mercenary military activities, which is documented for the V century[12]. The Samnite economy was based predominantly on sheep-rearing, with constant transhumance and the acquisition of new territories. Agriculture played a secondary role, especially in inland parts of Samnium. These aspects made the Samnites a warlike people, always ready to attack. In this regard, Apennine communities of shepherd-warriors are known as early as the Bronze Age[13]. The Pozzilli material (90 subjects) is better preserved than that of Novilara, with several nearly complete skeletons.

The necropolis of Quadrella was used as a burial area starting from the IV century AD, during the Roman Imperial age. The Quadrella material (95 subjects) is well preserved. The graves are variably

TABLE 1
SEX DISTRIBUTION OF THE INDIVIDUALS FROM THE NOVILARA, POZZILLI AND QUADRELLA NECROPOLIES

	Infants	Adolescents	Males		Females		Undetermined sex		Adults
	N	N	N	%	N	%	N	%	N
Novilara	3	3	44	40	53	48.2	13	11.8	110
Pozzilli	11	7	43	59.7	24	33.3	5	6.9	72
Quadrella	18	4	26	35.6	30	41.1	17	23.3	73

TABLE 2
AGE DISTRIBUTION OF THE INDIVIDUALS FOR WHOM AN AGE ESTIMATION WAS POSSIBLE

	Novilara						Pozzilli						Quadrella					
	Males		Females		Und. Sex		Males		Females		Und. Sex		Males		Females		Und. Sex	
N	22		30		0		34		18		1		22		22		4	
Age	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
20–29	6	27.3	13	43.3	0	0	10	29.4	9	50	1	100	5	22.7	8	36.3	1	25
30–39	3	13.6	4	13.3	0	0	11	32.3	4	22.2	0	0	0	0	1	4.5	0	0
40–49	1	4.5	2	6.7	0	0	5	14.7	1	5.5	0	0	1	4.5	3	13.6	0	0
50–59	7	31.8	5	16.7	0	0	4	12	2	11.1	0	0	6	27.3	2	9.1	1	25
>60	5	22.7	6	20	0	0	4	12	2	11.1	0	0	10	45.4	8	36.3	2	50

oriented and some burials are of incinerated remains. Analysis of the grave goods in relation to skeletal remains revealed certain differences between the graves of males and females, especially regarding the non-random kind of ceramic typologies. The association – ewer, oil lamp, coins – prevails in the female graves, while the graves of males have less objects. The epigraphic data, when present, refer to burials of »liberti« (freed slaves)[14]. From the anthropological point of view, the subjects buried at Quadrella appear to differ from the populations of Latium and from the Samnites, as represented by the Pozzilli skeletons. For a correct anthropological interpretation, it is necessary to consider both endogamy due to geographical isolation[15] and the consequences of Romanization of the region.

The sex and age distributions of the subjects from the three necropolises are reported in Tables 1 and 2. The criteria of the sex and age determinations were the same for the three necropolises: the coefficients of sexualization for sex[16,17]; the degrees of dental wear[18] and cranial suture obliteration[19–21] for age. The pelves were not used to assess age because in most cases they are incomplete or, for Novilara, not present.

Since adolescents and infants are poorly represented, we decided to analyze adults only.

For each observed segment, we recorded the state of preservation and, when present, the typology of the traumatic lesion, its type (depression, bending, compression, torsion, tension, penetrating), location and degree of repair[1,2,22–24]. All

the preserved skeletal segments were examined and a bone was included if at least 75% of it was present. It should be remembered that since studies of ancient skeletons rarely deal with well preserved material, it might be difficult to follow the methodology of Lovejoy and Heiple[4]. In fact their study used only complete bones, whether fractured or normal, in the quantitative analysis. However, in this way a lot of information would be lost and the frequencies would be underestimated.

To determine statistically significant variations in the presence of traumatic lesions between the sexes and among populations, we used the Chi square test with Yates' correction for small samples (if the expected frequency is less than five)[25].

Results

The highest number of individuals with lesions is at Pozzilli (17/72 subjects), followed by Quadrella (14/73 subjects). In both cases, the frequency of fractures is significantly higher ($p<0.001$) than at Novilara (4/110 subjects). This pattern is the same when the sexes are considered separately. At Novilara, the lower frequency of fractures (3.63%) is due to the poor preservation of the material and the fact that the only recordable fractures are cranial ones. There is a clear difference between Pozzilli and Quadrella in the distribution of traumatic lesions per age class (Table 3). This refers mainly to males, since very few females present lesions. At Pozzilli, the highest frequency of fractures is in males 30–39 years old, while at Quadrella they are found only in subjects older than 50 years.

Skull

The highest frequencies of cranial lesions are observed at Pozzilli and Novilara, and they mainly involve males. There is no difference between the sexes at Quadrella (Figure 1). The cranial fractures generally involve only the four bones of the vault: frontal, parietal, temporal and

TABLE 3
DISTRIBUTION OF ALL FRACTURES BY AGE CLASS, INCLUDING ADULTS WHOSE AGE COULD NOT BE ESTIMATED

	Novilara						Pozzilli						Quadrella					
	Males		Females		Un.sex		Males		Females		Un.sex		Males		Females		Un.sex	
Total N	44		53		13		43		24		5		26		30		17	
Age	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
20–29	0	0	0	0	0	0	2	14.3	1	50	0	0	0	0	0	0	0	0
30–39	1	33.3	0	0	0	0	7	50	0	0	0	0	0	0	0	0	0	0
40–49	0	0	0	0	0	0	2	14.3	0	0	0	0	0	0	0	0	0	0
50–59	1	33.3	0	0	0	0	0	0	0	0	0	0	2	25	1	25	0	0
>60	1	33.3	1	100	0	0	2	14.3	1	50	0	0	6	75	3	75	2	0
Adults	0	0	0	0	0	0	1	7.1	0	0	1	100	0	0	0	0	0	0
Total	3	6.82	1	1.89	0	0	14	32.6	2	8.33	1	20	8	30.7	4	13.3	2	11.7

N = number of individuals with at least one fracture.

The frequency given for the age group is the % of individuals bearing fractures among all individuals with fractures; in the Total line the % refers to the percentage of individuals bearing fractures among all individuals of that sex observed.

occipital (Table 4). The number of these four segments is similar in the three necropolises. There are only small depression fractures at Quadrella and Pozzilli, except for that of grave 95 at Pozzilli (male, 30–35 yrs.). Subject T27b from Quadrella (Figure 2) presents two circular, superficial depressed fractures involving the left frontal (1 cm in diameter) and the right parietal boss (1.7 cm in diameter and 2 mm in depth). Neither of the lesions involves the inner table. The old female from grave 55 (>60 yrs.) of Quadrella presents an ovoid (1.7 × 1 cm) superficial depression on the right frontal boss. The individual from grave 95 at Pozzilli (Figure 3) exhibits a circular blunt trauma (3.5 × 2 cm and 0.7 cm of depth) in the left asterion area involving the left temporal and the occipital, with a forward shift and rotation of the mastoid and its detachment from the occipital. The lesion also caused a cleft tympanic plate. The inner table presents strong remodeling. Subject T69 (male; >60 yrs.) from Pozzilli presents a superficial, ovoid

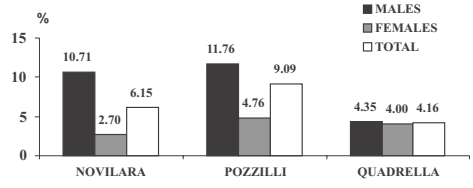

Fig. 1. Frequencies of cranial lesions in the individuals of Novilara, Pozzilli and Quadrella.

TABLE 4
FREQUENCY OF CRANIAL FRACTURES

	Males			Females		
	N	n	%	N	n	%
NOVILARA						
Frontal	24	0	0	31	1	3.23
Parietal (R)	24	1	4.17	30	0	0
Parietal (L)	22	1	4.55	30	0	0
Occipital	24	1	4.17	30	0	0
Temporal (R)	23	0	0	28	0	0
Temporal (L)	20	1	5	24	0	0
Total	137	4	2.91	173	1	0.57
POZZILLI						
Frontal	31	1	3.23	19	0	0
Parietal (R)	33	1	3.03	21	0	0
Parietal (L)	34	1	2.94	19	1	5.26
Occipital	34	1	2.94	20	0	0
Temporal (R)	27	0	0	17	0	0
Temporal (L)	32	1	3.13	16	0	0
Total	191	5	2.61	112	1	0.89
QUADRELLA						
Frontal	22	1	4.55	24	1	4.17
Parietal (R)	21	1	4.76	23	0	0
Parietal (L)	23	0	0	23	0	0
Total	66	2	3.03	70	1	1.42

N – number of segments; n – number of lesions.

hollow (3.1 × 2.2 cm) behind the right parietal with signs of healing; the inner table is intact. A similar lesion (1.2 × 0.7 cm) is present on the left parietal of subject T103 from Pozzilli (male, 20–25 yrs.).

At Novilara, there are two penetrating fractures. The individual from grave Cat. No. 85 (males, 30–35 yrs.) presents a penetrating fracture affecting the left temporal and parietal (Figure 4). This is a linear trauma (8.5 cm in length and 4 mm in depth) that cut the temporal squama, which is almost completely fused with the parietal. Evident signs of healing are present on the inferior edge of the groove. The subject from grave S90 (male, 55–60 yrs.) presents a buttonhole lesion (3.5 cm in length, with a distance of the margins from the central area of 0.8 cm) in the left squamous portion of the occipital, equidistant from lambda and inion. The continuity between the external and internal surfaces of the bone and the presence of a small osteophyte suggest an ongoing repair process. At Novilara, there are also two depression fractures in subjects >60 years (male, Cat. No. 81; female, Cat. No. 102). The individual from grave Cat. No. 81 presents a superficial, circular trauma with a fine cribrosity at the center. The hollow in-

Fig. 2. Subject T 27b from Quadrella (male, >60 yrs.) who presents a depression fracture involving the frontal and right parietal (white circle).

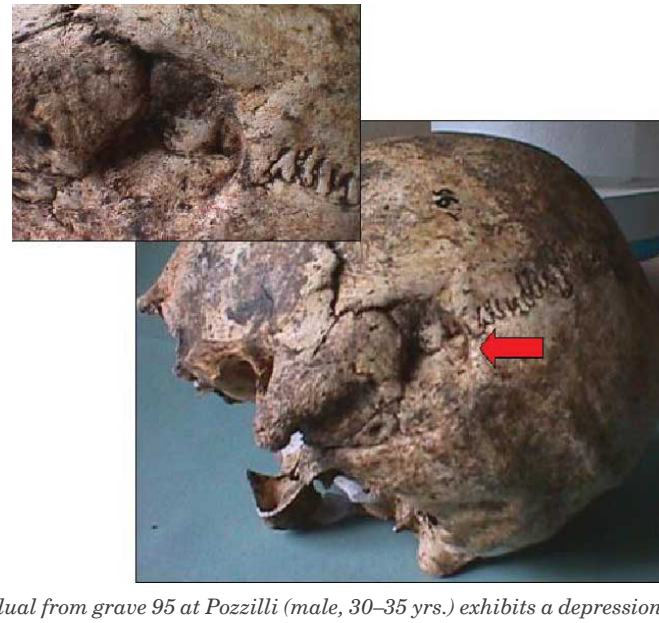

Fig. 3. Individual from grave 95 at Pozzilli (male, 30–35 yrs.) exhibits a depression fracture involving the left temporal and the occipital (red arrow). a: particular of the lesion.

volves only the external table of the right parietal, near the sagittal suture. The subject from grave Cat. No. 102 presents a small flattened area on the right zygomatic process of the frontal (1.1 × 0.5 cm).

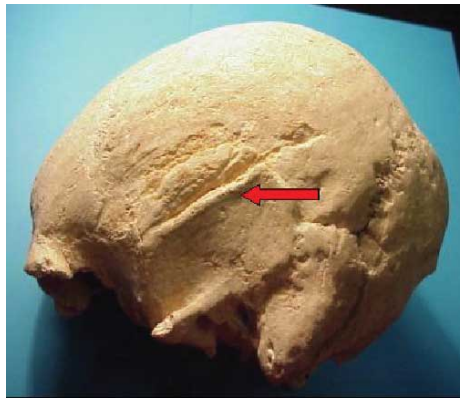

Fig. 4. Individual from Cat. No. 85 at Novilara presents a penetrating fracture affecting the left temporal and parietal (red arrow).

The severity of a lesion is indicated by its morphology and size (area and depth) but also by the condition of the inner table, which is usually unaltered in superficial traumatic lesions. This is the case for the fractures at Quadrella (T27b, T55) and at Pozzilli (T69, T90 female >60 y, T103). Alterations of the inner table are only present in the subject from grave 95 at Pozzilli and two subjects from Novilara (Cat. No. 85 and S90).

Postcranial skeleton

The distribution of the fractures by sex and segment is illustrated in Table 5. As we did not find postcranial traumatic lesions at Novilara, we will only deal with the data for Pozzilli and Quadrella. The available segments were usually complete or represented by the diaphysis, although all fragments were considered.

At Pozzilli, fractures are only found among males, most frequently on the clavicle (6.67%), radius (4.62%) and tibia (3.85%). At Quadrella, postcranial traumatic lesions affect 13 males and 2 females (radius 1/46; ulna 1/49). The clavicle is infrequently affected by fractures (2.86%). Among Pozzilli males, the segments of the upper and lower limbs are almost equally affected by lesions, with no right-left distinction and without significant differences ($p>0.05$). At Quadrella, the difference between upper and lower limb segments is small ($p>0.05$), but all lower limb lesions (6/147 segments) are on the right side (Table 5).

TABLE 5
DISTRIBUTION OF TRAUMAS BY SEGMENT (MALES)

	Total		
	N	n	%
POZZILLI			
Humerus	70	0	0
Radius	65	3	4.62
Ulna	62	1	1.61
Femur	80	0	0
Tibia	78	3	3.85
Fibula	59	1	1.69
Upper limb	197	4	2.03
Lower limb	217	4	1.84
Clavicle	60	4	6.67
Total	474	12	2.53
QUADRELLA			
Humerus	47	1	2.13
Radius	44	2	4.55
Ulna	41	3	7.32
Femur	50	0	0
Tibia	50	3	6.00
Fibula	47	3	6.38
Upper limb	132	6	4.55
Lower limb	147	6	4.08
Clavicle	35	1	2.86
Total	314	13	4.14

N – number of segments; n – number of lesions

There are no significant differences between the two necropolises either in the total number of lesions (p=0.223) or in the distribution by side (right: p=0.124; left: p=0.98).

At Pozzilli, there are complications of fracture repair in 9 of 12 cases, such as lateral translation of the segments, overlapping and exuberant bony callus, while at Quadrella complications are somewhat less frequent (6/13).

With regard to the type and location of lesions, the fractures are mostly complete and located on the diaphyses in the Pozzilli and Quadrella specimens. At Pozzilli, the clavicular diaphyseal lesions are mostly on the sternal third, while the two epiphyseal fractures are on the same individual and involve the sternal end. At Quadrella, the only clavicular fracture is on the lateral epiphysis. There are three radial lesions at both Quadrella and Pozzilli; all the cases (Pozzilli: T94b and T97, males, 30–35 years; Quadrella: T62 and T79b, female >60 years) involve the left radius and are typical Colles fractures. The other two radial lesions involve the diaphysis: one (Pozzilli, T51, male, 35–40 yrs.) is an oblique fissure fracture at midshaft of the right radius; the other (Quadrella-T77-male, 55–60 yrs.) is an incomplete transverse fissure fracture in the distal third of the left radial shaft. The ulnar lesions are all diaphyseal and affect one individual from Pozzilli (male, 45–50 yrs.) and four from Quadrella (three males and one female, >60 yrs.). Subject T101 from Pozzilli presents a complete, proximal-distal anterior-posterior oblique fracture in the distal third of the right ulnar shaft; it is completely fused, with a medial shift of the distal end. At Quadrella, two subjects (T13, male; T55, female both >60 yrs.) have oblique fractures of the distal third of the ulna, which are fused with anatomical continuity of the fragments. Subject T21a (male, >60 yrs.) presents an alteration of the posterior margin of the distal third of the left ulna, with a remodeled surface. Subject T79c (male, >60 yrs.) presents a complete transverse fissure fracture in the distal third of the right ulnar shaft. The femur is never affected by fractures. At Pozzilli, one subject (T51) presents supramalleolar fractures on both tibiae associated with a fracture of the left fibula, while the individual from grave 16 (male, >60 yrs.) has a thickened area on the right tibia. Three subjects from Quadrella (T16*, T27b, T62, all males >60 yrs.) present similar oblique fractures in the distal third of the right tibial and fibular shafts. The lesions healed in two cases, with exuberant bony callus, lateral translation, angulation and overlap of the fragments. Other fractures were observed on the ribs (Pozzilli: 2 males and 1 female; Quadrella: 2 males and 1 female) and the metacarpals (Pozzilli: 2 males; Quadrella: 1 male and 1 female), while at Quadrella we recognized signs of a fracture of the pubic ramus of the left innominate bone (male, T6).

The presence of two polytraumatized individuals from Pozzilli should also be mentioned. Subject T97 presents the Colles's fracture of the left radius described above. The left clavicle (only the diaphysis is preserved) has a bony callus on the anterior and inferior portions of the medial third; irregularities on the inferior surface suggest a multiple fracture. The sternal end of the left first rib presents a transverse fracture line with formation of bony callus at the sternal end. At least four other fragments have periostitic apposition of bone tissue on the anterior surface of the sternal extremity, possibly of post-traumatic origin, while other fragments show signs of remodeling.

Subject T105 (Figure 5) presents a double lesion that modified the morphology of the shoulder girdle. The sternal end of the left clavicle presents a transverse fissure fracture with exuberant bo-

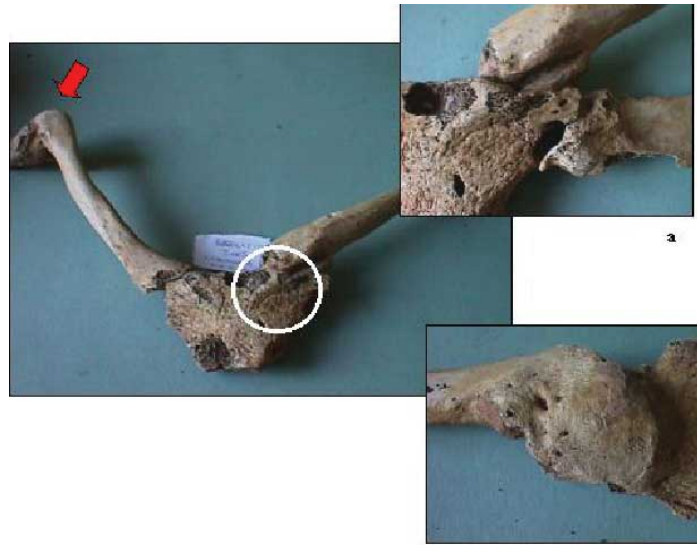

Fig. 5. Subject T 105 from Pozzilli (male, 35–40 yrs.). Note the two clavicular epiphyseal lesions (on the left and right side) which involve the sternal end (white circle). a,b: particular of the lesion.

ny callus, which caused its fusion with the manubrium sterni and consequent medial translation and immobilization. In the lateral epiphysis, the surface for articulation with the acromion is remodeled. The right clavicle (shorter than the left) presents a complete fracture that detached the lateral fragment; it shifted inferiorly and dorsally with an antero-posterior rotation and fused with the diaphysis, with formation of exuberant bony callus. The lesion did not modify or damage the glenoid cavity, which presents only slight marginal lapping.

Discussion and Conclusion

Depressed fractures are the only ones present at Pozzilli and Quadrella. In particular, the extensive damage in the left asterion area of the subject from grave 95 at Pozzilli strongly suggests aggression rather than an accident[22,26]. In at least two other Pozzilli individuals (T69 and T103), the morphology and location of the depressed fractures indicate the action of a rounded, blunt object.

At Quadrella, the morphology and position (mainly on the right side) of the depressed fractures in subjects T27b and T55 suggest that they resulted from accidents rather than violence. In fact, most cranial injuries due to interpersonal violence are found on the left side, indicating an attack by a right-handed adversary[27]; it should be remembered that 90% of humans are right-handed[28]. Moreover, the lesions are very superficial and it is not possible to identify the point of impact or the mechanism of injury, as there are no secondary fractures of the vault related to the force of impact. These considerations, the low severity of the lesions, their location and the old age of the subjects lead us to infer accidental traumas.

The shape and location of the cranial lesions of the young man from grave Cat. No. 85 at Novilara agree with the diagnostic criteria for sharp force injuries[24], which are often caused by a sharp object

like a blade. This cut mark can be interpreted as an intentional trauma, probably the result of a frontal attack by a right-handed adversary. In subject S90 (Novilara), the buttonhole lesion on the left side of the occipital was probably caused by a sharp pointed weapon like a dagger, spear, javelin, arrow or sword. The morphology of the lesion, with a central linear perforation and lateral non-perforating groove, is consistent with a sword-cut on a curved surface (deeper at the impact point than on the sides) or with a lesion caused by a weapon with a penetrating point. In both cases, the individuals survived the incident and there was total or partial repair of the lesions, indicating that they were treated or at least given some assistance. That the two lesions were probably caused by violent clashes is indirectly confirmed by the long list of weapons found in the graves at Novilara, even though the main activities of the population were agriculture and livestock-rearing, supplemented by hunting, fishing and craftsmanship[7,8].

The superficial depressed fractures of the elderly subjects Cat. No. 81 and Cat. No. 102 from Novilara are very similar to those described for Quadrella, in terms of their morphology, size, position, severity and also the age of the subjects. These considerations lead us to the same conclusion that they are of accidental origin.

Trepanation can be excluded as the cause of the depression fractures in the three necropolises; these lesions only involve the outer table, which is depressed, and the strong reaction of the bone tissue observed in cases of trephination is absent. Moreover, there are no traces of cuts or scraping in the area surrounding the lesion, considered distinctive signs of trepanation[29].

An interpretation of the postcranial traumatic lesions is only possible for Pozzilli and Quadrella. Among the Pozzilli males, the most affected bone is the clavicle, followed by the radius, whereas at Quadrella, the ulna, tibia and fibula present the highest frequencies. Two of the radial fractures at Pozzilli and two at Quadrella are classical Colles's fractures, which typically occur when an individual attempts to break a fall, accidental or not, by thrusting his arms forward[1,4,22,23,27,30]. In subject T62 from Quadrella, there is also a repaired fracture of the left first metacarpal. The lesions could have occurred at the same time, but it is difficult to conclude this with certainty. The two ulnar lesions (without radial involvement) in subject T79c from Quadrella and in the polytraumatized individual from grave T101 at Pozzilli are typical »parry fractures«. The »parry fracture« is a transverse fracture of the middle or distal shaft of the ulna, possibly associated with a similar fracture of the radius[30]. It is usually interpreted as the result of the individual's attempt to defend his head or upper body against a right-handed attacker[2]. Indeed, Crawford-Adams[31] interprets transverse fractures, particularly of the ulnar shaft, as signs of violence, caused by direct blows**.**

In subject T51 from Pozzilli, with fractures of both tibiae and the left fibula, the morphology (well-aligned) and location of the lesions strongly indicate that they occurred at the same time. The same individual presents a fracture of the right radius. The lesion on the right tibia of subject T16 could be the response to a blow, with possible ossification of a haematoma.

It is not possible to precisely establish the dynamics of the events that led to the lesions observed at Quadrella, but the very similar characteristics of the fractures, their location and type can probably be attributed to the strenuous work activities performed by the individuals rather than to clashes with adversaries. In fact, clinical and anthropological observations show that a high incidence of

traumatic lesions on the tibia, fibula and foot bones is generally associated with activities involving stress on the legs, like running and jogging[32] or running on hard ground[33]. Moreover, oblique fractures are generally associated with serious accidents, such as falls[34,35]. Molleson[36] suggested that tibia-fibula fractures may have been relatively common in rural agrarian activities, especially when an individual fell while his feet were immobilized in plough furrows. This hypothesis is supported by the different distributions of the traumatic lesions between the sexes and between sides, and by the similar involvement of the upper and lower limbs; these aspects can be attributed to the difficult living conditions of the populations, probably composed of individuals from low social classes (perhaps slaves) and thus involved in hard manual labor.

It is difficult to define the event that caused the injuries in the polytraumatized individual from grave T97 from Pozzilli. The fact that the thoracic and clavicular lesions are all on the left side suggests that they were contemporaneous. Moreover, their medial, rather than lateral, location suggests that they resulted from a violent blow delivered by a right-handed adversary. Fulcheri et al.[37] emphasized that serious traumas in males involve almost exclusively the shoulder girdle and/or upper limbs, likely indicating activities related to fighting, war or defense. Nevertheless, we cannot exclude that the injuries were due to a fall. Indeed, falling is believed to be one of the most frequent causes of clavicular fractures[2,4]. Interpersonal violence could also be invoked to explain the lesions on the clavicles and ribs of subject T105, especially since no other skeletal segments present alterations. However, once again the hypothesis of a fall cannot be excluded.

Based on the observations of Grauer and Roberts[34], we have concluded that some individuals survived long enough to allow complete repair of the fractures, even though the lesions were serious enough to compromise their ability to move, thus reducing their autonomy. However, the observed deformations testify to the fact that reduction of fractures was not commonly practiced and that in the most serious cases (T51 from Pozzilli and T16* from Quadrella) there was a high probability of contracting infections.

Finally, the most important result of our study is that, at least for Pozzilli and Quadrella, the traumatic lesions can be attributed to the different life-styles and activities performed in the two populations.

At Pozzilli, several lesions (e.g. skull and clavicle) can be attributed to interpersonal violence. The subjects are almost always males and the younger age classes are most affected, i.e. ages when almost all individuals actively participate in social and economic activities[4]. In addition, many of the graves (51, 69, 97, 101, 103, 110, 111) contained iron spears, knives or blades. Therefore, the population buried at Pozzilli appears to have had a rather aggressive and violent life-style. This hypothesis is supported by our knowledge of the life of transhumant shepherds, the expansive tendency in the *ver sacrus* which led them to compete with their neighbors for land, and the need to defend the territory, as shown by the presence of *oppida*[9].

At Quadrella, the prevalence of lesions in the lower limb and their morphology (oblique fracture in the distal third of the leg) are presumably related to accidental traumatic events, like falls, or work activities requiring great physical effort. This is confirmed by the fact that the Quadrella population was mainly involved in agriculture and livestock-rearing and that no weapons indicating warlike activities were found among the grave goods[14]. The »greenstick« femoral fracture found

in the 9 year-old child from grave T15 at Quadrella can also be interpreted in this light, as it is reasonable to suppose that a child of that age was already involved in agricultural activities.

Similar evaluations are more difficult for Novilara, given the absence of post-cranial bones. However, the data for the skull support the hypothesis of a population composed, at least in part, of warriors. Various bronze and iron weapons were found in several graves of males, as well as two-wheeled chariots probably used in war.

Therefore, we can conclude that traumatic lesions observed on skeletons are related to the life-styles of populations, even though it is often difficult to interpret them precisely. For a correct interpretation, it is useful to supplement the anthropological data with archaeological information to provide an additional cultural framework.

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P. Brasili

Department of Experimental Evolutionary Biology, Anthropology Unit, University of Bologna, Via Selmi 3, 40126 Bologna, Italy
e-mail: patricia.brasili@unibo.it

TRAUMATSKI DOGAĐAJI I NAČIN ŽIVOTA U DREVNIM POPULACIJAMA ITALIJE

S A Ž E T A K

Traumatske lezije često se nalaze na arheološkim skeletnim ostacima i daju nam korisne informacije o različitim kulturalnim aspektima te o ponašanju proučavanih populacija. Cilj rada bio je procijeniti odnos između raspodjele i vrste traumatskih lezija skeleta te različitih stilova života u starim populacijama. Istražene su tri nekropole u centralnoj Italiji. Pozzilli (6.–4. stoljeće prije Krista) i Quadrella (1.–4. stoljeće poslije Krista) istog su zemljopisnog područja (Molise) no pripadaju različitim periodima. Novilara (9.–6. stoljeće prije Krista) smještena je u Marcheu i pripada željeznom dobu kao i Pozzilli. Lezije uočene u Pozzillli ne izgledaju kao slučajno nastale, dok se one u Quadrelli mogu pripisati slučajnim, ne-namjernim događajima. Kranijalne ozljede zamijećene u Novilari podupiru hipotezu kako je riječ o ratničkoj populaciji (barem djelomice). Rezultati sugeriraju prisustvo odnosa između traumatskih lezija skeleta i načina života istraživanih populacija.