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FINAL NEOLITHIC MULTIPLE BURIALS IN THE UPPER EBRO VALLEY: THE CASE OF SAN JUAN ANTE PORTAM LATINAM (BASQUE COUNTRY, SPAIN)

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Abstract
San Juan ante Portam Latinam is a small rock shelter in the Basque Country (Upper Ebro Valley, Spain), dated to 3.300-3.000 cal. BC., it was excavated in 1985, 1990 and 1991. The site is a mass burial which includes at least 338 individuals of both sexes and all ages, accompanied with many stone and bone tools, as well as ornamental objects. The site is of great importance due to the evidence of projectile injuries by arrow heads detected in several individuals.
Key words: Paleoanthropology, Collective Burials, Final Neolithic, Upper Ebro Valley.

Cultural context

During the Final Neolithic and the Eneolithic there are essentially two contemporary types of burial found in the Upper Ebro Valley: caves or rock shelters and megalithic graves. It is not known why some populations decided to bury their dead in caves and not in megaliths, or *vice versa*. Certain authors attribute this to economical reasons and argue that it is posible that populations with low resources for constructing megaliths had to bury their dead in second importance graves; other authors prefer the hypothesis of different religious traditions within those communities (Armendáriz, 1992: 18). In both cases, they are mass burials (despite a few exceptions) that held a variable number of skeletons, usually lower than one hundred (Table 1).

The site of San Juan ante Portam Latinam contains at least 338 individuals. Within the large group of prehistorical sites located in the left bank of the Ebro river, it is the largest osteological collection of this period, and one of the most important sites in the Iberian Peninsula (Fig. 1).

Table 1. Main sites with human remains in the Upper Ebro Valley.

Name of the site	Type of burial	Minimum number of individuals (mni)
Alto de la Huesera	Megalith	45
Chabola de la Hechicera	Megalith	38
El Sotillo	Megalith	13
Fuente Hoz	Cave	9
Gobaederra	Cave	81
Gúrpide Sur	Megalith	10
La Mina	Megalith	12
Los Husos	Rock Shelter	7
Los Llanos	Megalith	100
Peña Larga	Rock Shelter	21
San Juan ante Portam Latinam	Rock Shelter	338
San Martín	Megalith	21
Yurdinas II	Cave	95

The site

A) The discovery
On April 1985, an excavator disinterred a pile of skulls and bones in a track near the town of Laguardia, in Basque Country. Due to this information, a survey was conducted, which led to the beginning of an archaeological excavation. It was commanded to José Ignacio Vegas and the excavations were developed in 1985, 1990 and 1991 (Vegas et al., 1999: 32).

B) Description of the site
San Juan ante Portam Latinam is facing a south rock shelter constituted of local sandstone and clay (Fig. 2). It is almost semicircular, but its actual dimensions are impossible to determine because of the previous excavations, that cut away part of the shelter. In any case, the dimensions do not seem to have exceeded an original area of 20 m², and the average height of the shelter is 1.75 m.

C) Chronology
After the excavation of 1985, two radiocarbon dates (both around 4,000 BC) were obtained. Despite their coincidence, they seemed too old for a context without geometric microliths, so in 1990 and 1991 new samples were taken, which were sent to two separate laboratories. The new group of eight dates was quite homogeneous and more representative of the period, having an average date between 3,300 and 3,042 cal BC (Fig. 3).

Figure 1: The mass burial (VEGAS & coll., 1999: 45).

Figure 2: San Juan ante Portam Latinam prior to the excavation (VEGAS & coll., 1999: 27).

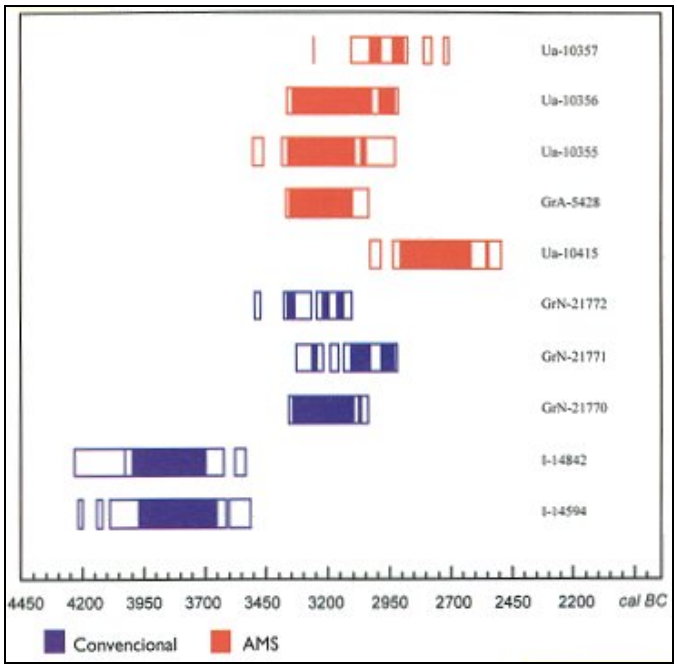

Figure 3: Radiocarbon dates of the site (VEGAS, 2007: 102).

The burials

A) Population structure

The anthropological research done by F. Etxeberria and L. Herrasti (Vegas, 2007) identified a MNI of at least 338 individuals (this number was obtained by the sum of skulls). Of these 202 were subadults and 136 were adults (Table 2).

Table 2. Population structure (VEGAS, 2007: 188).

Age classes	Male	Female	Indeterminate	Total Skulls
Child I	-	-	-	95
Child II	-	-	-	36
Adolescent	23	12	24	59
Subadult (Ind.)	-	-	-	12
Young adult	48	17	10	75
Middle adult	32	15	2	49
Old Adult	4	2	-	6
Adult (Ind.)	-	-	-	7
Total	107	46	36	338

Age class distribution (Table 3). The main methodology used for age determination is based on the analysis of the features of the skulls [cranial suture closure for estimating adult skeletal age (Keyet al., 1994) and for subadults the variation in the timing of dental development (Ubelaker, 1987; González, 1999)]. Other methods were also used for estimating age (e.g. the study of pubic symphyseal surface, epiphyseal closure, model tooth attrition, the presence of degenerative signs, etc.).

Table 3. Age class distribution (VEGAS, 2007: 188-192).

Age classes	Number of individuals
Child I (0-7 years)	
Foetus (before birth)	3
18 months	4
< 2 years	2
3 years	3
4 years	13
5 years	9
6 years	7
Child I (Ind.)	53
Total	95
Child II (7-12 years)	Number of individuals
7 years	7
8 years	5
9 years	3
10 years	4
11 years	4
Child II (Ind.)	13
Total	36
Adolescent (12-20 years)	Number of individuals
12-15 years	12
15-17 years	24
18-20 yers	9
Adolescent (Ind.)	13
Total	58
Subadult (Ind.) (<20 years)	Number of individuals
Subadult	11
Total	11
Young adult (20-40 years)	Number of individuals
20-25 years	26
25-30 years	15
30-35 years	7
35-40 years	12
Young Adult (Ind.)	15
TOTAL	75
Middle adult (40-50 years)	Number of individuals
40-45 years	18
45-50 years	15
>50 years	14
Middle adult (ind.)	2
TOTAL	49
Old adult	Number of individuals
> 60	6
TOTAL	6
ADULT (Ind.)	Number of individuals
>50	7
TOTAL	7

Determination of sex. For the diagnosis of sex the methods used were the criterion of the Workshop of European Anthropologists (W.E.A.; Ferembach et al., 1980) and those included in the *Standards for data colletion fron human skeletal remains* (Buikstra and Ubelaker, 1994). The determination of sex was based on the observation of characteristics on the jaw, pelvis and skull (preferably the skull due to its good conservation) of adults and well identified adolescent children.

Therefore, the distribution of sex is predominantly male individuals (70% of the 153 individuals sexed). This is observed in all of the age categories: 72% of young adults, 67% of middle adults and similar results for older adults (Table 4).

Table 4. Determination of sex (VEGAS, 2007: 194).

Age Class	Male	Female	Ind.	TOTAL
Child I	-	-	95	95
Child II	-	-	36	36
Subadult (Ind.)	-	-	12	12
Adolescent	23	12	167	59
Young adult	48	17	10	75
Middle adult	32	15	2	48
Old adult	4	2	-	6
Adult (Ind.)	-	-	7	7
Total	107	46	185	338

B) Paleodemographic data

In the table of mortality (Fig. 4) was distributed in 5 year intervals (Acsádi & Nemeskéri, 1970). The table showed an important representation of children under 1o years of age (3,96%) and a homogeneous ratio (10-11%) in the next three intervals (10-14 / 15-19 / 20-24). Finally, after 25 years, the number of individuals starts progressively decreasing.

Comparing this table with the typical demographic model of an archaic or preindustrial society (Lederman, 1969), an apparent scarcity of infant individuals under 12 months can be observed. However, the life expectancy was fixed at 20,3 years, within the characteristic margin of a preindustrial society with an important subadult population. In addition, two inflection points can be distinguished: the first one from 5 to 9 years, and the second one from 25 to 30 years, when the life expectancy begins to decrease (Fig. 5).

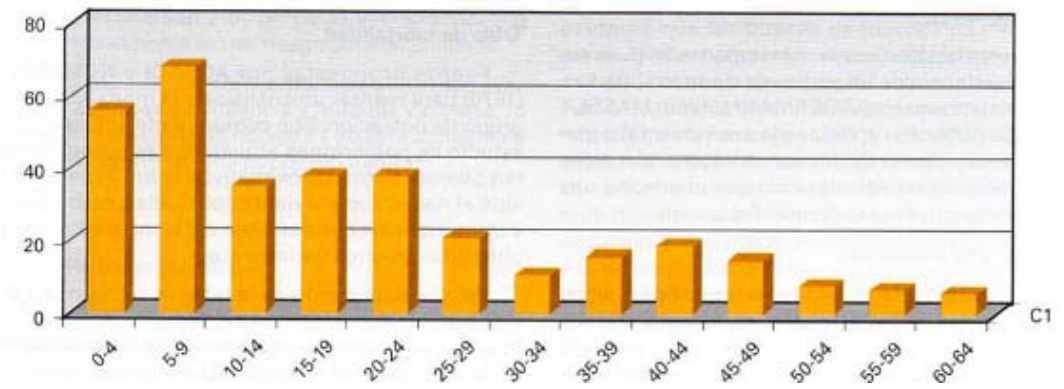

Figure 4: Table of mortality (VEGAS, 2007: 196).

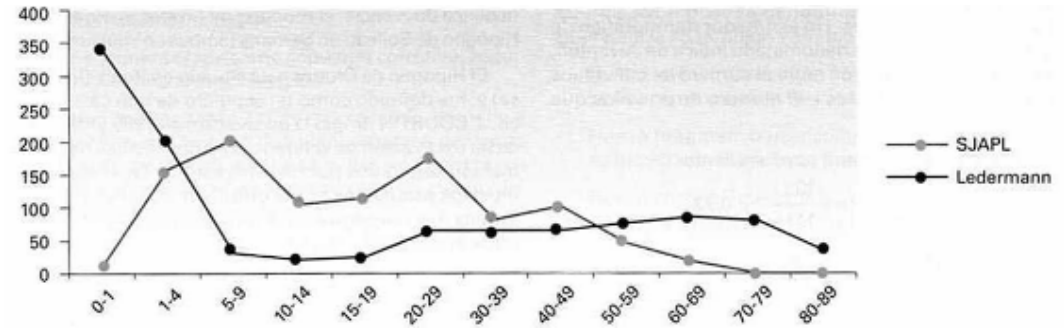

Figure 5: Comparison between the demographic model of an archaic society of Lederman (1967) and the one observed in San Juan ante Portam Latinam (Vegas, 2007: 197).

Respecting the palaeodemographic estimators (Bocquet-Appel and Masset, 1977), San Juan ante Portam Latinam´s population has a significant Youth Index. Firstly, the relationship between the individuals deceased from 5 to 9 years of age and the ones that died from 10 to 14 years, provides an index of 1,94, which is similar to that of hunter-gatherer societies (frequently near to 2). However, the ratio between the deceased population from 5 to 14 years and those that died after 20 years (0.73), does not coincide with the characteristic ratio for farm societies (usually between 0,100 and 0,300). This shows an abnormal proportion of subadult to adult populations (5 to 14 years). In fact, the index doubles this proportion.

C) Anthropological data

Even though the final report has been published recently, we have hardly any data about the measurements of San Juan's population. Only a few epigenetic features of the skulls were analized (Table 5).

Respecting the analysis of body construction and height (Trotter and Glesser, 1958), it is evident that the existence of a strong body composition (compared with other mediterranean populations) and a mid-high height near of 167.4 cm (Table 6), but it was not possible to establish differences by sex due to the scarce number of measurements clearly attributed to female individuals.

Finally, it must also be emphasized that there are signs on the lower limbs that are indicative of intensive exercise, such as: compression in the proximal part of the femur (*platimeria*) and in the diaphysis of the tibia (*platicnemia*), and also the presence of facets in the front side of the extremity of the tibia.

Table 5. Epigenetic features of the skulls.

Epigenetic feature		Number of skulls	%
Metopic suture		15	4.4
Wormian bones	Asterionic bone	57	8.7
	Bregmatic bone		0.5
	Coronal bone		8.4
	Lambdoid bone		7

Table 6. Height (VEGAS, 2007: 204).

		Number of measurements	Rank of measurements	Measurements
Lower limbs	Femur	45	152.5 a 187	165.11
	Tibia	41	154 a 187	166.2
	Fibula	10	153 a 191	167
Upper limbs	Humerus	34	150 a 179	164
	Ulna	11	167.5 a 182	172.8
	Radius	16	158 a 175.5	169.3
Total				167.4

C) Paleopathological data

Projectile trauma injuries

Injuries by arrow heads. They have been indetified in 12 cases, 8 of them having signs of survival for a long time. Within these cases, two of the skeletons had two chronologically different injuries: specimen I had a healed injury in the arm and another un-healed injury in the lumbar part of the spine. Specimen II had osteogenic signs in one injury in the ribs and another injury in the *os coxae* without them. It must be stated that all the injured individuals were male, and the majority of these were adults. Finally, it is common to find at this site the injuries on the rear side of the bodies (Fig. 6).

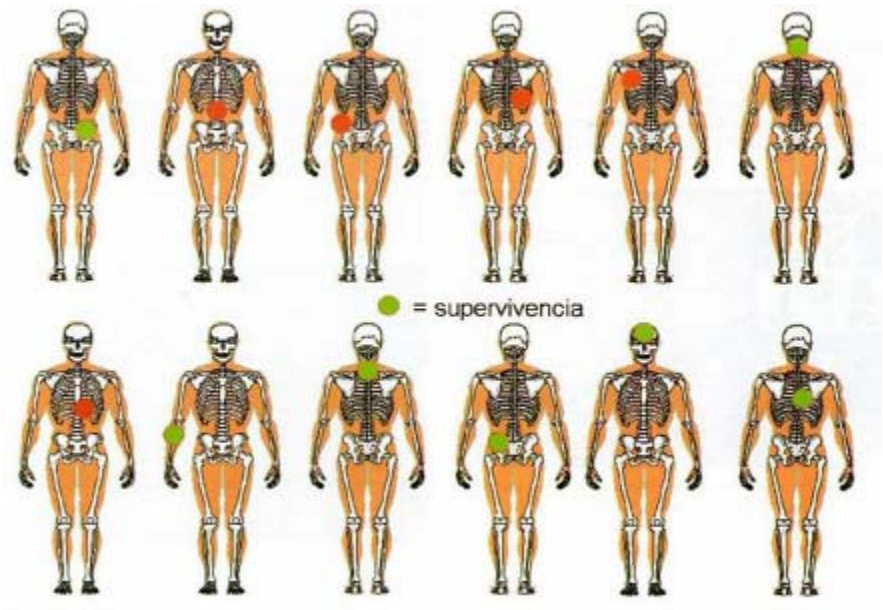

Figure 6: Injuries by arrow wounds (VEGAS, 2007: 219).

Contusions and fractures. The presence of contusions can be found, as grazings in 28 skulls. Almost all of these are due to unintentional injuries. Therefore, they are normally located in the frontal and both parietal bones of male individuals and they are most commonly found on the right side. The fractures are frequently located on the upper limbs, affecting the forearm. There are 5 cases of *Monteggia* type fractures (those produced by a direct strong blow on the humerus when the victim is trying to protect herself with the forearm; Fig. 7). There are also fractures found throughout the body, for example: 2 on the tibia, 4 on the rib, 2 of *Colles* type (on the wrist), 2 on the clavicle, 4 on the foot and 1 on the hand. At the same time, it must be emphasized that there is one anterior-posterior dislocation in the right shoulder which has caused the formation of a neoarticulation between the humerus and the scapula.
Infectious signs. There is only one tibia that shows signs of a chronic infection (osteomyelitis), maybe produced by a traumatic injury that affected pretibial zone.

Figure 7: Montiggia type fractures (VEGAS & coll., 1999: 75).

Rheumatisms
Arthropathies. They are commonly located in the spinal column (especially in the mobile segments). These are most probably related to the age of the affected individuals. Within the extravertebral articulations there are also clear signs of arthrosis, like those located in the hip (with a bilateral case) and in the knees.
Enthesophatic exostosis. These are caused by ossification in the place where ligaments are inserted (periarticular areas). In San Juan ante Portam Latinam 24 cases have been identified, specifically located in the insertions of the achilleous-calcaneous system.
Osteocondritis. These bone defects usually appear in the surface of some articulations, they are similar to gaps where bone does not look completely formed. There are 18 cases, commonly situated in the proximal articulation of the first phalange of the foot.

Tumours
They have been identified in one adult male (probably older adult) some injuries maybe compatible with a metastasis, related to malignant growths possibly located in the scapula, spinal column, pubic bones, sacrum, both femurs and astragalus (RÚA et al., 1995). The diagnosis is either the Ewing´s sarcoma, a prostate carcinoma or a lung carcinoma, but it is not conclusive.

Anatomic variants and malformations
From the 36 cases described in the analysis, there are 5 cases spondylosis in the lumbar vertebra, with no apparent repercussions in the function and stability of the vertebral articulation.

Dental injuries
The number of carious lesions is not high (around 13%), in most cases it affects the molars, preferably on the right side of maxilla and mandible. Quantitatively, the presence of alveolar reabsorption is more important, particularly in the molars. The abscesses principally affect the maxilla. The teeth lost during life are usually the molars of the maxilla, and this occurs with asymmetry. The wearing of teeth is similar in both sides of the mouth, and the progressive evolution of periodontal disease results in the appearance of instability of teeth.

Trepanations
In San Juan ante Portam Latinam there are four clear cases of trepanation: one artificial hole of 23 mm. in the frontal bone (Fig. 8), one of 40 mm. in the left parietal, one of 70 mm. in the right parietal and finally, one of 10 mm. in the occipital bone. Three of these have signs of survival due to the observation of the remodelling of injury´s periphery. Within the four cases represented the trepanning techniques are: abrasion, drilling and incision (Vegas, 2007: 268).

Figure 8: Trepanation on the frontal bone (VEGAS, 2007: 268).

D) Stress signs
The anthropological analysis (VEGAS, 1999: 74) revealed the inexistence of male individuals affected by cribra orbitalia, comparated to the 52.94% of female in reproductive age that presented this pathology (most probably related to anaemia). Enamel hypoplasias were also found with a middle degree of effection, possibly attributable to a deficiency in nutrition during childhood.

E) The analysis of diet
The presence of dental pathologies (RÚA & ARRIAGA, 2004) allowed the different components of diet to be evaluated, and its influence in the formation of certain pathologies. A total of 6.394 permanent teeth and 1.147 deciduous teeth were studied leading to the following results:

- Dental caries in permanent teeth was found in 13.22% of the total sample. 70% on the occlusal side (evidence of a diet with a high consumption of sugar rich food, like wild vegetables). The presence of polycaries is also prevalent (which could be related to an intensive consumption of cariogenic carbohydrates, typical of wild fruits). Finally, there was a slight presence (14%) of root caries suggesting a dependence on starched produce.
- On the other hand, the presence of caries in deciduous teeth (13.4%) showed evident consumption of carbohydrates, probably prior to weaning, suggesting the existence of a food handling, previously unknown for pre-neolithic societies.
- The predominance of plaque on teeth has also been analized, this mineralization is caused by proteins and starched produce, which is evidence of a common consumption of pulses and animal proteins.
- In respect to the *ante mortem* dental loss (not only related to the diet but also to other factors like the age and the attrition of teeth), San Juan ante Portam Latinam offers low values with regard to other farming societies.
- Periodontal disease suggests that plaque played an important role in the genesis of the disease, so the contribution of proteins could be relevant.
- Finally, the outstanding attrition can be related to the consumption of cereals or, on the other hand, to the consumption of certain wild fruits, preferably to fibrous or hard ones, like acorns.

Material culture
The non skeletal remains found in San Juan ante Portam Latinam were, on the one hand, manufactured objects, like 129 flint tools [58 of them arrow wounds (Fig. 9)], 6 pottery fragments, 5 bone punches, 2 polished axes, 9 wild boar canines (8 used as simple necklaces and 1 as a spatula), 3 drilled marine shells, more than 200 *dentalium* shells and 45 necklace beads. On the other hand, some faunal remains were found, as few ungulate bones and a decapitated skull of a small dog, whose head was placed in a tomb (probably related to a ritual practice).

The Controversy around the Interpretation of the Site
The research team has suggested that San Juan ante Portam Latinam could be a simultaneous or quasi-simultaneous burial with a bellicose origin (Vegas, 1999: 110-113; Vegas, 2007: 274). This hypothesis is based on:

1. The homogeneous composition of the material culture: 35% of it composed by leaf-shaped arrow heads.

2. The appearance of 12 cases with injuries by arrow heads affecting male individuals (6 of them with no signs of survival after the impact). Within the rest of the population, there were 47 wounds, at least 23 could have affected the soft tissues of the individuals (based on the proximity of wounds to some bones; Vegas, 2007: 220). The other men, women and subadults could have died by the action of arrow heads later recovered from the bodies, by blows of stick and other weapons made of perishable materials. As J. I. Vegas said (1999: 111), the massacre could be "the result of an ambush", this interpretation is based on the study of the direction and impact of the arrows.
3. The datings are contemporary enough.

However, there are some problems that question the hypothesis of simultaneousness (Rúa et al., 1995):

4. The gap in the distribution of the different anatomical parts is very significant: the limb bones of the forearms and legs are less represented than the ones of the arms and thighs. For example, 42% of all individuals had the tibias and between a 26 and 27% of them had the radius. C. de la Rúa (1995: 587) has interpreted this fact as the intentional removal of anatomical parts, probably due to the will to clean the area of burials for being able to bury more bodies inside it.
5. During the excavation, a minimum number of articulated skeletons were recorded, between 42 and 58 individuals, a 15-20% of the total. It seems obvious to affirm that if they had been buried simultaneously, there would not be so few represented.
6. Some skull accumulations have been detected, a total of 38, near the walls of the rock shelter, perhaps as a result of periodical reorganization of the burial.
7. Only 12 of the 338 individuals have injuries by arrow wounds (7 of them with signs of survival). The rest of the injuries related to violent acts seem to have healed, therefore they do not match up with *perimortem* events.

Figure 9: Arrow Wounds (VEGAS & coll., 1999: 94).

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