

Human Osteoarchaeology of Monte Claro Culture Eneolithic Remains in Southern-Central Sardinia

P. Martella¹, V. Pusceddu¹, R. Floris¹

¹ Dipartimento di Biologia Sperimentale - Sezione di Scienze Antropologiche, Cittadella Universitaria S.S. 554 - km 4,500 09040 Monserrato (CA).

E-mail: martellapatrizia@gmail.com

KEY WORDS: Monte Claro, paleobiology, physical anthropology, skeletal materials.

Introduction

In this paper the first results of the osteoarchaeological examination of human skeletal remains recovered from two Copper Age Monte Claro sites are presented. The so-called Monte Claro culture, named after the first findings in 1906 during construction of the Psychiatry Hospital on the eponymous hill in the city of Cagliari, is a cultural phase of the Sardinian Copper Age dating between 2700 and 2200 BC (Tykot, 1994) which appears all over the island. It is characterized, among other features, by a typical pottery mainly decorated with parallel grooves. During this cultural phase, Sardinian populations utilized different burial types and funerary rituals. Burials are in lithic cists, pits, natural caves, reused *domus de janas* carved and already used by previous human groups, underground, newly carved oven-shaped tombs with entrance shaft, with a single room and several individual spaces or several rooms (via Basilicata, Cagliari: Moravetti, 2009). In several instances, the deceased had clearly been laid in crouched position on their left side, accompanied by simple grave goods, mainly pottery. When the grave is a stone cist or a pit, the corpses were laid singularly or in groups of two or three (Lai, 2008). However, also collective burials, both primary and secondary, are recorded (Moravetti, 2009).

Materials and Methods

The human skeletal materials subject of this paper are from central and southern Sardinia. The site of Sa Costa is Crus is located in the territory of Settimo San Pietro, a municipality in the Cagliari province, whereas the site of Corti Beccia is in the vicinity of Sanluri, on the Campidano plain, north of Cagliari.

The excavation campaign at Corti Beccia was carried out in 2005 under supervision of Donatella Cocco, officer of the Soprintendenza per i Beni Archeologici per le Province di Cagliari e Oristano, and brought to light still unpublished collective burials in simple pits dug in the ground, attributed to the Copper Age and described as pertaining to a 'transitional' Monte Claro. The remains

come from five deposition pits ('sacche' IV, XIII, XIV, XV and XVI) and five stratigraphic units (US 35, 36, 37, 38 and 39), are in bad conditions probably due to soil chemistry and to agricultural activities. Bones are very fragmented and fractures appear for the most part ancient. One AMS radiometric determination from Oxford Radiocarbon Accelerator Unit, still to be interpreted, coming from feature 16, US72, I.4, places the skeletal remains at an older age than expected, opening two options: either this is the earliest known aspect of the Monte Claro culture, or the pit contained remains from earlier times relative to the cultural materials.

The excavation campaign of the site Sa Costa is Crus, carried out in 2007 under supervision of Maria Rosaria Manunza officer of the Soprintendenza per i Beni Archeologici per le Province di Cagliari e Oristano, brought to light records of human presence in discontinuous phases, from the sub-Ozieri phase (Late Neolithic-Early Copper Age) up until Late Roman times. Several burials were unearthed, among which five date to the Monte Claro phase; four of them also had skeletal materials. All burials were pits with a low entrance closed by a drystone wall (Manunza, 2010). These skeletal materials are generally in better conditions than those from Corti Beccia, with the exception of tomb 40.

All osteological materials from both sites has been handled with standard laboratory procedures: cleaning, refitting, labeling. Due to the high fragmentation, reconstruction has been in some cases only partial, and will require further time and labor to be completed.

Sex estimation has been carried out following the procedures of Acsádi and Nemeskéri (1970) and Ferembach *et al.* (1979). Whenever the most discriminant portions of the skeleton were missing, different degrees of robusticity between male and female bones were considered, although keeping in mind that this feature is affected by variability at the individual and population level. Age at death estimation was carried out by combining different methods that consider the morphology of pubic symphysis (Brooks and Suchey, 1990), the degree of synostosis of cranial sutures (Meindel and Lovejoy, 1985), the morphology of ribs' attachment to the sternum (İşcan *et al.*, 1984-1985), and the degree of dental wear (Brothwell, 1981; Lovejoy, 1985). For subadults, dental eruption, both deciduous and permanent teeth, was examined following Ubelaker (1989), and the dimensions

of long bones and the fusion of epiphysis and diaphysis were considered (Scheuer and Black, 2000; Bertoldi, 2009). Estimation of stature *in vivo* was carried out according to different scholars (Manouvrier, 1893; Trotter and Gleser, 1952-58-77; Sjøvold, 1990), and the resulting values averaged. For subadults, stature estimation followed Doro Garetto *et al.* (1985). Wherever possible, indicators of pathology were documented (caries, arthropathies, traumatic lesions etc.) (Ortner Putschar, 1985), along with stress markers and their degree (Işcan and Kennedy, 1989; Mariotti *et al.*, 2007); analysis of enthesopathies was also carried out (Mariotti *et al.*, 2004). Morphological measurements were carried out following Martin and Saller (1957-62) and for each burial the minimum number of individuals (MNI) was calculated.

Results

The site of Corti Beccia contained the remains of at least 38 individuals, several of them represented by a few or only one skeletal element. Feature 15 was the largest group, with the remains of 12 individuals, two labeled I1 and I2, and ten mandibles.

At the site, all age classes are represented, from 2-year old children up to mature individuals. Out of 38, only four were recovered partially or fully articulated. One of them, named 'rannicchiato' during the excavation, was an adult male with traces of osteoperiostitis on his tibiae and tooth enamel hypoplasia.

Since no long bones were recovered intact, only in four cases an estimation of stature was attempted based on comparison with specimens of similar dimensions. Based on the fragmentary ulnae and radii, a stature of about 162 cm was estimated for individual 1 of feature XV; the two femur fragments of I2 yielded a stature slightly above 160 cm, whereas a femur from feature XIII and one from US38 a stature not lower than 172 was calculated.

One possible case of anemia reflected by the presence of porosity in the frontal bone on the orbital ridge, occurrences of osteoperiostitis and, regarding teeth, some caries and hypoplasias. Measurement of the specimens, whenever possible considering their degradation and therefore to be taken cautiously, highlighted that femurs often had low pilastric index, and humeri an apparently round transversal diaphyseal section (eurybrachia).

Burials at Sa Costa is Crus were all single, except tomb 40, where the presence of a third smaller incomplete ulna beyond two that are compatible with the same individual. The presence of a very masculine frontal bone, a compatible portion of mandible and pair of humeri, suggest the presence of an adult male. Particularly noteworthy the finding of reddish coloring on fragments of tibia and fibula: further examination will attempt to ascertain the nature of the pigment, possibly used for mortuary practices.

In tomb 41 the incomplete remains of a skeleton were recovered which resulted to pertain to a gracile female, crouched on her left side (Manunza, 2010). From the humerus' length – the specimen has been compared with a similar intact humerus because incomplete – a stature slightly higher than 154 has been estimated. Age estimation is around 40 years. A arthrosic alteration of the temporal-mandibular joint and of the articular surface of the occipital condyli was observed. Particularly interesting the presence of a beak-shaped bone growth at the *basion*, which protruding inside the foramen magnum could be an indication of a pathology with neurological implications, due to the pressure exerted on the marrow. The finding of four third molars may open the possibility of a second individual in the grave, but considering that there is no other evidence, it seems possible to attribute such presence to infiltrations from later inhumations at higher layers.

In tomb 42 the remains a male subadult were recovered, whose age was estimated in 15 ± 3 years and stature in about 160 cm. Calculus, enamel hypoplasia and osteoperiostitis were recorded, the latter particularly intense on the lower limb. Also, strong osteolysis at the point of insertion of the rib-clavicle ligament on both sides, at the point of insertion of the brachial muscle onto the ulna, and an intense porosity of the front side of the femur right below the head. Tomb 43 yielded the remains of an adult male of advanced age, probably beyond 50, whose stature was estimated in about 163 cm. Arthrosic alterations were observed on articular surfaces of the scapula, clavicle and vertebral bodies. Muscle insertions appear very prominent in the upper limb, and enthesopathy was also present in the fingers' flexor muscles insertions, and also, with extensive bone growth, on the patella and on the talo at the insertion of Achille's tendon.

CORTI BECCIA											
	SACCA IV	SACCA XIII	SACCA XIV	SACCA XV	SACCA XVI	US 35	US 36	US 37	US 38	US 39	TOT
Subadults up to age 7				2	3	3		1			9
Subadults over age 7				1		1					2
Adults	1	3	1	5	2			1	5	1	19
Indeterminate		2		1			1			1	5
Elderly				3							3
Caries	x			x					x		
Hypoplasia	x			x	x	x				x	
Osteoperiostitis	x	x		x	x						
In vivo tooth loss	x			x	x						
Nutritional deficiency				x							
Tooth neck erosion		x		x							
Anemia				x							38

Tab. 1. Corti Beccia: distribution of individuals by age classes, and presence of alterations.

Discussion

This work is part of a larger-scale project aimed at systematically comparatively studying all burial sites attributed to the Monte Claro culture. From the analysis of the remains from Corti Beccia and Sa Costa is Crus, two skeletal populations were described, respectively of 38 and 5 individuals, represented by both sexes and all age groups. Inhumations, whose deposition ritual involved in some cases a crouched position, do not seem to reflect different patterns based on age or sex, and for Corti Beccia the quality of such information is negatively affected by diagenetic degradation.

From an anthropometrics standpoint, the population seems to be in the average for stature and robusticity, with exception of two males, slightly higher than 170 cm. The average stature of Corti Beccia (166,5 cm), based on a few individuals, compares well with the Copper Age average, whereas the group of Sa Costa is Crus (159 cm) is closer to the average calculated for the Middle Neolithic (Sanna, 2006). Stress markers, extremely limited by the absence of epiphyses especially for Corti Beccia, suggest activities affecting mainly the upper limbs, which are particularly evident in the two males from Sa Costa is Crus tombs 42 and 43. The enthesopathic bone formations on the patella and talo of the individual in tomb 43 mentioned above could indicate very intense or prolonged activity stressing the lower limb. On bone remains and even more on teeth there are indicators of undernutrition and/or malnutrition, such as enamel hypoplasia and caries, which however reflect conditions common to other prehistoric and protohistoric populations.

With the objective of having as much information as possible on a phase represented by scarce and often ill-preserved skeletal materials, on the site of Corti Beccia a paleonutritional component has been added – by analyzing trace element in bone tissues, and a paleobotanical component – by analyzing pollen in the sediments. Unfortunately, the results did not provide any further information, since trace element analysis (of Sr, Zn, Cu, Pb and in addition Ca and Mg), showed levels of Ca too high relative to the standard values, suggesting ion exchange with the soil. The palynological analysis only provided information on the formation of the sediment and/or the soil used to cover the burials.

References

- Acsádi G, Nemeskéri J., 1970. *History of human life, span and mortality*, Akadémiai Kiadó, Budapest.
- Brooks S., Suchey J.M. 1990. Skeletal age determination based on the os pubis: a comparison of the Acsádi-Nemeskéri and Suchey-Brooks methods. *Hum. Evol.*, 5: 227-238.
- Brothwell D. R. 1981. *Digging up bones*. Oxford University Press, Oxford.
- Doro Garetto T., Fulcheri E., Gerbore R., Prono G. 1985. *Manuale di antropologia archeologica*. Civico museo archeologico e di scienze naturali "Federico Eusebio", Alba.
- Ferembach D., Schwidetzky I., Stloukal M. 1979. Raccomandazioni per la determinazione dell'età e del sesso sullo scheletro. *Rivista di Antropologia*, 60: 5-51.
- İşcan M.Y., Loth S.R., Wright R.K. 1984. Age estimation from the rib by Phase Analysis: White males. *J. Forensic Sci.*, 29: 1094-1104.
- İşcan M.Y., Loth S.R., Wright R.K. 1985. Age estimation from the rib by Phase Analysis: white females. *J. Forensic Sci.*, 30: 853-863.
- İşcan M.Y., Kennedy K.A.R. 1989. *Reconstruction of life from the skeleton*. Wiley-Liss, New York.
- Lai L. 2008. *The interplay of economic, climatic and cultural change investigated through isotopic analyses of bone tissue: the case of Sardinia 4000-1900 BC*. PhD Dissertation, Department of Anthropology, College of Arts and Sciences, University of South Florida, Tampa.
- Lilliu G. 2003. *La civiltà dei sardi, dal Paleolitico all'età dei nuraghi*. II Maestrale. Nuoro.
- Lovejoy C.O. 1985. Dental wear in Libben population: its functional pattern and role in the determination of adult skeletal age at the death. *Am. J. Phys. Anthropol.*, 68: 47-56.
- Manouvrier L. 1893 La détermination de la taille d'après les grands os des memebres. *Bulletin et Mémoires de la Société d'Anthropologie*, 4: 347-402.
- Manunza M.R. 2010. *Bau su Matutzu. Sardinia: segni del potere in una sepoltura del III millennio a.C.* Scuola Sarda Editrice. Cagliari.
- Mariotti V., Facchini F., Belcastro M.G. 2004. Enthesopathies: proposal of a standardised scoring method and applications. *Collegium Antropol.*, 28 (1): 145-159.
- Mariotti V., Facchini F., Belcastro M.G. 2007. The study of entheses: proposal of a standardised scoring method for twenty-three entheses of the postcranial skeleton. *Collegium Antropol.*, 31 (1): 291-313.
- Martin R, Saller K 1957-1962. *Lehrbuch der Anthropologie*. G. Fischer Stuttgart.
- Meindel R.S., Lovejoy C.O. 1985. Ectocranial suture closure: a revised method for the determination of skeletal age at death based on the lateral-anterior sutures. *Am. J. Phys. Anthropol.*, 68:57- 66.
- Moravetti A, 2009. La cultura di Monte Claro e il Vaso Campaniforme. I.I.P.P. *Atti della XLIV Riunione scientifica la preistoria e la protostoria della Sardegna*, 1: 97-106.
- Ortner D.J., Putschar W.G.J. 1985. *Identification of pathological conditions in human skeletal remains*. Smithsonian Institution Press, Washington and London.
- Sanna E. 2006. *Il popolamento della Sardegna e l'origine dei sardi*. Cucc, Cagliari.
- Scheuer L., Black S. 2000. *Developmental juvenile osteology*. Academic Press, San Diego.
- Sjøvold T. 1990. Estimation of Stature from long bones utilizing the line of organic correlation. *Hum. Evol.*, 5: 431- 447.
- Trotter M., Gleser G.C. 1952. Estimation of stature from long bones of american whites and negroes. *Am. J. Phys. Anthropol.*, 10: 463-514.
- Trotter M., Gleser G.C. 1958. A re-evaluation of estimation of stature based on measurements of stature taken during life and of long ones after death. *Am. J. Phys. Anthropol.*, 16: 79-123.
- Trotter M., Gleser G.C. 1977. Corrigenda to estimation of stature from long limb bones of american whites and negroes. *Am. J. Phys. Anthropol.*, 47: 355-356.
- Tykot R.H. 1994. Radiocarbon dating and absolute chronology in Sardinia and Corsica. In: Skeates R., Whitehouse R., *Radiocarbon dating and Italian Prehistory*. Accordia Specialist Studies on Italy London: 115-145.
- Ubelaker D.H. 1989. *Human skeletal remains: excavation, analysis, interpretation* (2nd ed.) Taraxacum, Washington.