

# Multidisciplinary Approach in the Study of Early Middle Age Burials discovered in Sovana (GR)

E. Di Francia<sup>1</sup>, A. Ferrarese Lupi<sup>1</sup>, R. Boano<sup>2</sup>, G. Barbieri<sup>3</sup>

<sup>1</sup> Gruppo Archeologico Torinese, via Santa Maria 6/E, 10122 Torino, Italy. E-mail: segreteria@archeogat.it

<sup>2</sup> Università degli Studi di Torino, Dipartimento di Scienze della Vita e Biologia dei Sistemi, via Accademia Albertina 13, 10123 Torino, Italy

<sup>3</sup> Soprintendenza per i Beni Archeologici della Toscana, via della Pergola 65, 50121 Firenze, Italy

KEY WORDS: bones, paleopathology, Tuscany, Lombard.

## Introduction

Since 2004, the team of the voluntary organization Turin Archaeological Group (GAT) has carried out the "Fiora Hills Archaeological Research Project" with the supervision of the Superintendence for Archaeological Heritage of (Diciotti, 2011). Among a wealth of archaeological sites, a Roman rural villa, overlaid by a Medieval cemetery, has been identified near Sovana (Sorano-Grosseto). Field situation was complex: sampling test excavations showed different burial phases and a pluristratified rural settlement. The investigation of the site was part of a two-year multidisciplinary study that has identified different human burials and isolated grave goods. The research was conducted by the field school thanks to the synergic action of authorities and universities that have guaranteed the admission to their physical and anthropological laboratories to volunteers.

## Materials and Methods

During the archaeological campaign, some burials and assemblages of bones were excavated (Fig. 1). An isolated belt element covered by hard sediment was retrieved too.



Fig. 1. Excavation of a burial.

Field procedures for skeletal remains were planned in order to ensure their integrity during exposure and recovery. Several laboratory analyses have been applied for sex and age-at-death determination, stature estimation and paleopathological observations (Charlier and Lorin De La Grandmaison, 2008; Canci and Minozzi, 2005; Murail *et al.*, 2005; Aufderheide and Rodriguez Martin, 1998; Barnes, 1994; Borgognini Tarli and Pacciani, 1993; Iscan and Kennedy, 1989; France and Horn, 1988; Brothwell, 1981; Acsádi and Nemeskéri, 1970; Trotter and Gleser, 1958; Manouvrier, 1892-93).

The accelerator mass spectrometry (AMS) radiocarbon dating was performed by CEDAD (University of Salento) in order to obtain a chronology by human bones analyses (Calcagnile and Quarta, 2011). Non-invasive techniques, such as digital radiography and qualitative X-Ray Fluorescence (XRF), were performed on metal artifact in order to evaluate the structure, highlight decorations and assess chemical composition (Corsi, 2011).

## Results

Eight individuals have been recovered until now: four male, two female, one subadult (around 16-17 years) and one infant. Average stature estimated is about 157 cm for females and 170 cm for males. The skeletons are in poor condition, showing differing degrees of preservation due to diagenetic events: only in two cases it was possible to reconstruct the entire skeleton and identify probable traces of decomposition (Fig. 2). Paleopathological analysis



Fig. 2. Left parietal (endocranial). Traces of decomposition.

has identified the presence of degenerative joint disease as a result of mechanical stress (in particular on axial skeleton and knees), congenital defects such as incomplete sacralization of L5 resulting from cranial shifting of lumbosacral border (Fig. 3) and cranial non metric variations

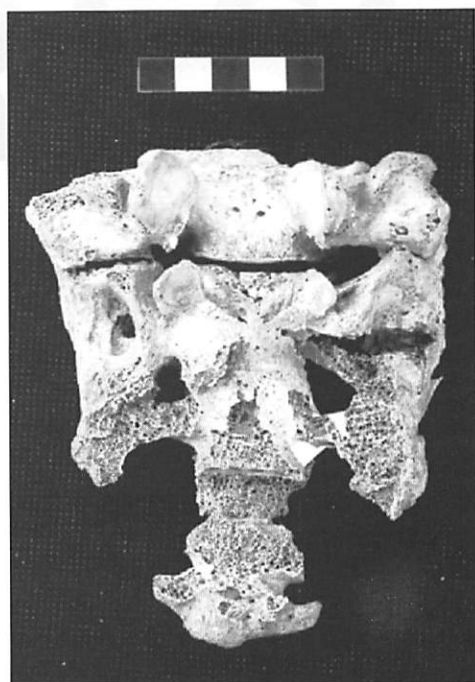


Fig. 3. Sacrum (posterior view). Developmental field defect of the axial skeleton: sacralization of fifth lumbar vertebra.

(sutural bones). Cases of bone remodelling are also present, such as enthesiopathies and micro-trauma (myositis ossificans) due to intense physical activities, and teeth wear, due to a heavy attrition on anterior dentition (Fig. 4).



Fig. 4. Tooth wear due to heavy attrition on anterior dentition.

The uncalibrated  $^{14}\text{C}$  dating of the bone samples is:  $1180 \pm 45$   $^{14}\text{C}$  yr BP (calibrated AD 700-750 and AD 760-980 ( $2\sigma$ ), samples LTL5705A and LTL5707A) and  $1284 \pm 50$   $^{14}\text{C}$  yr BP (calibrated AD 650-870 ( $2\sigma$ , sample LTL5706A).

The most significant result in digital radiography performed on the belt element was the identification of a refined

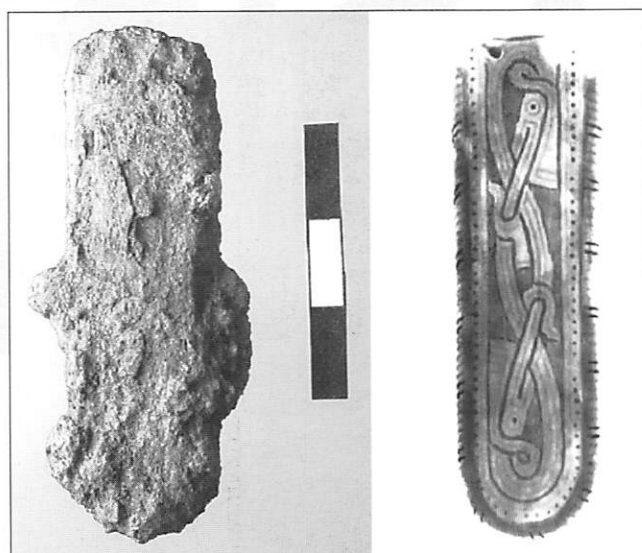


Fig. 5. Belt element: object (left) and X-Ray (right), with micro-focus Hamamatsu source and TDI Hamamatsu detector, tube voltage of 90 kV and tube current of 500 microA.

decoration depicting a zoomorphic composition (Fig. 5). Qualitative XRF analyses showed that the metals used are iron, for the base, and silver and brass (copper-zinc) for the decoration, which is realized with *agemina* and plating techniques.

## Discussion

The analyses of the archaeological context highlight a close similarity between our case and adjacent archaeological areas, where the existence of small Lombard settlements are already proved (Ferrarese Lupi, 2011).

Anthropological analyses outlined stature values similar to the other Lombard groups in the region (Turini, 2009). Robustness of the bones and evidences of biomechanical stresses, mostly in the load-bearing joints, particularly in the spine and knees, suggest active occupations during life. Regarding the observation of non metric traits, the study highlights the presence of frequent sutural bones. The presence and the distribution of non metric cranial variants have been used by some authors to assess biological relationship.

Chronological limits (from second half of 7<sup>th</sup> - 10<sup>th</sup> century) and stylistic and elemental analyses of the metal object by X-ray, support the hypothesis of a Lombard cultural context. In conclusion, the study provided several interesting data to understand a complex historic moment, at the present not much known, such rural settlements near Sorano and Sovana during the Early Middle Ages. The multidisciplinary approach has reinforced the network among authorities, not always so close.

## Acknowledgments

The authors wish to sincerely thank Alessandro Lo Giudice (Department of Experimental Physics), Angelo Agostino

(Department of General Chemistry) of the University of Turin and the all GAT volunteers involved in this project.

## References

- Acsádi G., Nemeskéri J. 1970. *History of human life span and mortality*. Akadémiai Kiadó, Budapest.
- Aufderheide A.C., Rodriguez Martin C. 1998. *The encyclopedia of human paleopathology*. Cambridge University Press, Cambridge: 26-27, 393-412.
- Barnes E. 1994. *Developmental Defects of the Axial Skeleton in Paleopathology*. University Press of Colorado, Colorado: 110-114.
- Borgognini Tarli S., Pacciani E. 1993. *I resti umani nello scavo archeologico. Metodiche di recupero e studio*. Bulzoni ed. (collana Cnr. Comitato per la scienza e la tecnologia dei beni culturali), Roma.
- Brothwell D.R. 1981. *Dipping up bones*. British Museum, Oxford University Press.
- Calcagnile L., Quarta G. 2011. Risultati delle datazioni con il radiocarbonio. In: Barbieri G. (a cura di), *Il territorio di Sovana. Un decennio di ricognizioni e indagini archeologiche*. Nuova Immagine Editrice, Siena: 104.
- Canci A., Minozzi S. 2005. *Archeologia dei resti umani. Dallo scavo al laboratorio*. Carrocci Ed., Roma.
- Charlier P., Lorin de la Grandmaison G. 2008. Étude microscopique (optique et MEB) du liquide de décomposition solidifié. In: Charlier P., *Ostéo-archéologie et techniques médico-légales tendances et perspectives. Pur un «Manuel pratique de paléopathologie humaine»*. De Boccard, Paris: 189-200.
- Corsi J. 2011. Oltre il visibile: la radiografia per i reperti archeologici. In: Barbieri G. (a cura di), *Il territorio di Sovana. Un decennio di ricognizioni e indagini archeologiche*. Nuova Immagine Editrice, Siena: 105-108.
- Diciotti F. 2011. Il progetto dei Monti del Fiora. In: Barbieri G. (a cura di), *Il territorio di Sovana. Un decennio di ricognizioni e indagini archeologiche*. Nuova Immagine Editrice, Siena: 27-31.
- Ferrarese Lupi A. 2011. Località La Biagiola: relazione preliminare di scavo (campagne 2009-2010). In: Barbieri G. (a cura di), *Il territorio di Sovana. Un decennio di ricognizioni e indagini archeologiche*. Nuova Immagine Editrice, Siena: 83-92.
- France D.L., Horn A.D. 1988. *Lab manual and workbook for physical anthropology*. West Publishing Company, New York, Los Angeles, San Francisco.
- Iscan M.Y., Kennedy K.A.R. 1989. *Reconstruction of Life from the Skeleton*. Alan R. Liss, New York.
- Manouvrier L. 1892. Détermination de la taille d'après les grands os des membres. *Revue de L'École d'Anthropologie*, 2: 227-233.
- Manouvrier L. 1893. La détermination de la taille d'après les grands os des membres. *Bulletin et Mémoire de la Société d'Anthropologie de Paris*, 4: 347-402.
- Murail P., Bruzek J., Houët F., Cunha E. 2005. DSP: a tool for probabilistic sex diagnosis using worldwide variability in hip bone measurements. *Bulletins et Mémoires de la Société d'Anthropologie de Paris*, 17 (3-4): 167-176.
- Trotter M., Gleser G.C. 1958. A re-evaluation of estimation of stature based on measurements of stature taken during life and long bones after death. *Am. J. Phys. Anthropol.*, 16: 79-124.
- Turini M. 2009. Le sepolture di età Longobarda di Sovana (Grosseto): un lettura archeo-antropologica. *Science and Technology for Cultural Heritage*, 18: 127-138.