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The Etruscan Banquet: the Dream of Many, the Reality of Few. Nutritional Framework of Human Etruscan Groups in Volterra

A. Bacci[1], A. Franceschi[1], F. Bartoli[1], F. Mallegni[1]

[1]Departmentof Biology, University of Pisa. E-mail: fbartoli@biologia.unipi.it

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Introduction

The main objective of this research is to define the dietary habits of different groups of people lived in the Etruscan town of Volterra and evaluate any changes in the course of two different chronological phases: the phase of Villanova (IX-VII century BC) and Hellenistic period (III-II century BC). It also aims to verify the existence of a possible relationship between the traditional image of eating habits, which is celebrated by the Etruscan iconographic sources, and the data emerging from the analytical study of human skeletal remains.

Materials and Methods

The samples, analyzed by Atomic Absorption Spectroscopy (AAS), belong to the collection of Guarnacci Museum in Volterra, in which they identified two groups of Villanovian age and a third group of the Hellenistic period: a total of 36 cremated samples, of which only 25 are considered suitable for paleonutritional analysis.
The exclusion from the analysis of some samples is due either to the absence of useful osteological districts within of the urn or to a clear contamination of the samples.
For the reconstruction of eating habits of the Villanovian phase, we analyzed 16 samples from the necropolis of Le Ripaie (XIX – VIII century BC), where 21 burials, preserved in biconical urns with a bowl as lid, were found in simple earthen graves or in cylindrical pit tombs with drywall and tombstone (Cateni, 1981). The tipology of burials and of the pottery mixture of the biconical urns seems to refer to a cultural unit (Cateni, 2004).
For the immediately following chronological stage, we also examined 5 samples from the necropolis ofGuerruccia (second half of the eighth century BC – early seventh century BC), where burials – either inhumation either cremation - have been found of different type: in the simple pit, in crate or in jar, with the ashes preserved in typical biconical urns or in ceramic urns painted with ventricose forms (Mugnai, 1987).
Finally, the elaboration of the nutritional situation of the Hellenistic period is based on the study of four individuals preserved in the Pineschi tomb of the Portone's necropolis: a rectangular chamber tomb, which at the time of the discovery - by prof. Fiumi in 1970 - still had a lytic slab *in situ* as a closure of the *dromos*. Two urns of alabaster and three in *tufo of Pignano* were placed on the dock of deposition, as well as two unpainted craters, one of which shattered: seven burials within a few generations, for a chronological period between the end of the third and half of the second century BC (Cateni, 2004).
For all samples tested - both of the Villanovian age and of the Hellenistic period - the maximum temperatures of cremation are estimated between 550 °C and 630 °C according to the correlation between color and temperature (Shipman, 1984). The macroscopic alteration of skeletal remains, which were cremated at rather high temperatures, is unable to make a diagnosis of sex and age at death accurate and valid (Romagnoli, 1997).
It was further possible to insert the sample into broad groups of age: all the subjects examined proved to adults or young adults and have not identified the remains of infants or children. Finally, no evidence of pathological markers may be indicative of an effective and general well-being of human groups under study, but could be attributed to the fragmented nature of the material and the profound changes caused by the action of fire. These changes included the progressive combustion of the organic portion of the bone tissue up to 400°C and recrystallisation of the bone tissue beginning at 600°C (Holden *et al.*, 1995). The main original structural features of the mineralized bone tissue were unaltered when the specimes were heat – treated at any temperature in the range 200° - 600°C (Holden *et al.*, 1995).
Paleonutritional investigations, applied to the collection of cremated of the Guarnacci's Museum in Volterra, are processed by evaluating the concentrations of some trace elements, set in the bones through diet: strontium as an indicator of mostly vegetarian diet and zinc as an indicator of principally protein diet: particularly high concentrations of strontium are contained in green leafy vegetables, but also in molluscs and small fish (Sillen and Kavanagh, 1982; Brown, 1974), while significant levels of zinc (Underwood, 1977) are found in red meat, milk and dairy products, but also in molluscs and crustaceans of marine origin. The osteological samples, subject to appropriate and specific

laboratory process (Bartoli and Bacci, 2009), were taken from the cortical portion of the long bones, in order to easily remove internal and external surface and mitigate the problems of a contamination not uniform. Deprived of the surface by mechanical removal and washed in ultrasound baths in order to eliminate the presence of inorganic contaminants introduced during the deposition, the samples have been further incinerated at 600°C, to remove any residual organic component, and pulverized in special mortars. The ashes (0,500 g/dry weight), dried to remove the interstitial water of mineral hydration, have been subjected to two consecutive hot acid attack: 5 ml of HNO_3 and 5 ml of HCl (1 M). The samples, now in liquid form, have been carried to volume with distilled water (50 ml), then the dilutions processed according to the different trace elements to be detected by atomic absorption spectroscopy (AAS). The results obtained from the analysis have been processed on the basis of the different applied dilutions, according to the characteristics of the examined elements, and normalized in quantities of ppm (parts per million). In order to standardize the data and soften the influence of diagenetic contaminants, each analyzed trace element was usually related to calcium. Actually, the relationship element/Ca implies that any loss or enrichment in calcium involves changes of equal intensity in the other elements, a condition not always realized. Calcium is an element subjected to diagenetic alteration (Lambert *et al.*, 1985) and therefore the relationship with trace elements, which have a different behavior *post-mortem*, could be problematic. In many cases we recommended a paleonutrizional reconstruction based on interpretation of the absolute values expressed in ppm (parts per million).

Le Ripaie	Minimum Temperature	Maximum Temperature
RIP A1	550°C	660°C
RIP C	550°C	660° C
RIP C1	550°C	630° C
RIP E	550°C	660° C
RIP F	630°C	630° C
RIP G1	630°C	630° C
RIP H1	550°C	660° C
RIP J	550°C	550° C
RIP L1	550°C	630°C
RIP N1	550°C	660° C
RIP Q	550°C	630° C
RIP S1	550°C	630° C
RIP T	100°C	330° C
RIP U1	100°C	630° C
RIP V	100°C	330° C

Le Ripaie	Minimum Temperature	Maximum Temperature
RIP VILL.L	550°C	630°C
La Guerruccia	**Minimum Temperature**	**Maximum Temperature**
GUER 1	550°C	550°C
GUER 2	550°C	630°C
GUER 4	550°C	550°C
GUER 6	550°C	550°C
GUER 8	550°C	630°C
Tomba Pineschi	**Minimum Temperature**	**Maximum Temperature**
PIN 13/4: 692	330°C	330 °C
PIN 13/4: 693	330°C	630 °C
PIN 13/4: 694	550°C	630 °C
PIN 13/4: cratere	100°C	630 °C

Tab. 1. *Minimum temperature and maximum temperature of cremation.*

Calcium	Strontium	Zinc
250-350 mg/g	*Herbivores:* 400-500 ppm Omnivores: 150-400 ppm Carnivores: 100-300 ppm	*Herbivores:* 90-150 ppm *Omnivores:* 120-200 ppm Carnivores: 170-250 ppm

Tab. 2. *Reference values for paleonutritional analysis. Values expressed in ppm.*

Le Ripaie	Calcium (mg/g)	Strontium (ppm)	Zinc (ppm)
RIP A1	202	171	135
RIP C	200	172	124
RIP C1	205	116	73
RIP E	216	155	100
RIP F	203	197	110
RIP G1	208	120	105
RIP H1	198	177	144
RIP J	198	131	64
RIP L1	218	98	64
RIP N1	203	120	61
RIP Q	205	159	69
RIP S1	201	167	111
RIP T	206	113	63
RIP U1	204	199	62

Le Ripaie	Calcium (mg/g)	Strontium (ppm)	Zinc (ppm)
RIP V	206	154	53
RIP VILL.L	203	221	58
La Guerruccia	**Calcium (mg/g)**	**Strontium (ppm)**	**Zinc (ppm)**
GUER 1	202	112	74
GUER 2	206	98	38
GUER 4	207	144	50
GUER 6	201	109	32
GUER 8	204	94	37
Tomba Pineschi	**Calcium (mg/g)**	**Strontium (ppm)**	**Zinc (ppm)**
PIN 13/4: 692	197	211	160
PIN 13/4: 693	204	131	45
PIN 13/4: 694	198	325	197
PIN 13/4: cratere	203	161	71

Tab. 3. *Paleonutrition analysis results. Values expressed in ppm.*

	Sr/Ca	Zn/Ca
Le Ripaie	0,75 ± 0,19	0,43 ± 0,12
La Guerruccia	0,54 ± 0,09	0,23 ± 0,09
Tomba Pineschi	0,95 ± 0,47	0,59 ± 0,37
Standard	0,71	0,67

Tab. 4. *Paleonutrition analysis results. Mean values expressed as ratio element/Ca.*

The osteological collection, being the result of ancient excavations, does not have specific reports of excavation to allow a clear contextualization of findings and does not have samples of fauna useful for the correction of the analytical data with the site, by comparing the concentration levels of the human samples with those of herbivores lived simultaneously in the same site.

Results

The analysis results show a consistent - but steady - depletion of calcium, with average values of 204 ± 5 mg / g, and a substantial uniformity of diagenetic behavior between the Villanovian period (IX-VII centuryBC) and the period Hellenistic (third -second century BC). The food situation on villanovian samples from the necropolis of Le Ripaie results to be uniformly characterized by vast amounts of vegetable at the expense of protein intakes. In the population represented by this necropolis is possible to isolate a group - RIP C1, RIP G1, RIP J, RIP L1, RIP N1, RIP T - that shows modest, but constant, levels of strontium and zinc (Sr/Ca: 0,54 ± 0,09 e Zn/Ca: 0,35 ± 0,08) related to a nutritional framework consisting of very low intakes of vegetable and protein.
The remaining and larger sample has a nutritional framework of greater well being tilted in favor of vegetable and fish intake represented by very high concentrations of strontium (Sr/Ca: 0,87 ± 0,11) and at the expense of protein intake (Zn/Ca: 0,48 ± 0,17) indicative of a small but systematic consumption of meat.
The analysis conducted on samples of the necropolis of Guerruccia show levels of concentration (Sr/Ca: 0,54 ± 0,09 and Zn/Ca: 0,23 ± 0,09) compatible with the modest food situation found in most poor human group, isolated in the necropolis of Le Ripaie.
The samples from the Hellenistic Pineschi Tomb reveal finally a different situation: two people (PIN 693 e PIN CR.) have a nutritional framework similar to that characterizing Villanovian groups - modest, but not too poor, essentially vegetarian - while the remaining two individuals (692 and PIN PIN 694) show a situation of extraordinary well-being, characterized by an excellent consumption of vegetables and a considerable intake of protein and shellfish. The high variability of concentration levels of zinc and strontium (Sr / Ca: 0.95 ± 0.47 and Zn / Ca: 0.59 ± 0.37) seems to be the result of a major social differentiation and seems to indicate a nutritional framework in which stands out - for its rich dietary intakes - the individual PIN 694, associated with the main burial - the masculine urn - accompanied by an impressive set of ceramic dishes, forming the *served by banquet*.

Discussion

In the context of Villanovian phase, the nutritional framework is uniformly characterized by a clear preponderance of vegetable intake and a fair chance of access to food. The situations of more or less wellness - highlighted by our data - do not seem to be such as to justify significant social differentiation. The nutritional framework that emerges seems to be in line with the extreme simplicity of the economic and social components of this early Iron Age, in which the distribution of wealth must be uniform and subsistence strategies should be focused mainly on agriculture and exploitation of the environment.
The data relating to Hellenistic samples show a nutritional framework, where the variability of nutrient intakes seems to be index of a different accessibility to food resource, as a result of a major social differentiation. This nutritional framework can be compatible with the traditional image of the Etruscan banquet, in which the consumption of meat played an important role, as a sign of wealth of the nobility. In this sense, the data relating to these subjects seem to reflect the image of the rich banquet, celebrated in the ancient sources.

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