

# *New researches at the catacomb of Santa Mustiola. Funerary rituals and biosocial composition of the early Christian community of Chiusi (Siena, Italy)*

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**Abstract:** Since 2016 the Pontifical Commission for Sacred Archaeology, in collaboration with Roma Tre University and, since 2018, with the Bioarchaeology Service at the Museum of Civilization in Rome, has undertaken a new archaeological excavation project in the Catacomb of Santa Mustiola, Chiusi (Si). The stratigraphic excavation of the tombs has revealed an intense use of the graves, with a sequence of inhumations characterized by two clearly identifiable phases of occupation. The first one is chronologically referable at the 4th AD, while the second one dates back at least to the first half of the 5th AD.

The analysis of the over 300 individuals contributed to clarifying funerary dynamics and describing the life conditions of the community. The demographic profile indicates that individuals of all ages were buried in the Catacomb, even if with some anomalies. Another crucial aspect concerns the utilization of the cemeterial complex and the profile of its users in the various chronological phases.

**Keywords:** Late Antiquity, Early Christianity, Tuscany, Chiusi, Santa Mustiola, catacombs, funerary practice

**Résumé :** Depuis 2016, la Commission Pontificale d'Archéologie Sacrée, en collaboration avec l'Université Roma Tre et depuis 2018, avec le Service de Bioarchéologie du Musée des Civilisations de Rome, a entrepris un nouveau projet de fouilles archéologiques dans la Catacombe de Santa Mustiola à Chiusi (Si). La fouille stratigraphique des tombes a révélé une utilisation intense des sépultures, avec une séquence d'inhumations caractérisée par deux phases d'occupation clairement identifiables. La première est attribuable au IV<sup>e</sup> siècle de n.è., tandis que la seconde remonte au moins à la première moitié du V<sup>e</sup> siècle.

L'analyse des plus de 300 individus a contribué à clarifier la dynamique funéraire et à décrire les conditions de vie de la communauté. Le profil démographique indique que des individus de tous âges ont été inhumés dans la catacombe, même s'ils présentent quelques anomalies. Un autre aspect crucial concerne l'utilisation du complexe funéraire et le profil de ses utilisateurs dans les différentes phases chronologiques.

**Mots-clés :** Antiquité tardive, début du christianisme, Toscane, Chiusi, Santa Mustiola, catacombes, pratiques funéraires.

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## **Nouvelles recherches sur les catacombes de Santa Mustiola. Rituels funéraires et composition biosociale de la communauté paléochrétienne de Chiusi (province de Sienne, Italie)**

Depuis 2016, la Commission pontificale pour l'archéologie sacrée, en collaboration avec l'université Roma Tre et, depuis 2018, avec la section de bioarchéologie du Musée de la civilisation romaine a mis en œuvre un nouveau projet de fouilles archéologiques dans la catacombe de Santa Mustiola à Chiusi, dans la province de Sienne (Cipollone 1998 ; fig. 2). Ce projet visait à une meilleure compréhension des bornes chronologiques en relation avec le début et le développement de la nécropole souterraine, en précisant la durée et les modes de son utilisation. La fouille stratigraphique des tombes – comprenant 15 *loculi* et 29 *arcosolia* – a permis de mettre en évidence l'utilisation intense des sépultures avec une séquence d'inhumations caractérisée par deux phases d'occupation clairement identifiables (Bracon, 2018 ; Braconi *et al.* 2021 ; fig. 3). La première phase, qui est également la plus ancienne, peut être attribuée au IV<sup>e</sup> siècle et coïncide avec la construction et l'organisation des espaces tandis que la deuxième, qui date probablement de la première moitié du V<sup>e</sup> siècle ou avant, peut être mise en relation avec un mode d'utilisation de la catacombe différent : désormais, les tombes sont réouvertes et réutilisées de manières extrêmement diversifiées (fig. 11). Cette deuxième phase, qui est la plus récente, révèle plus particulièrement la réouverture et la réutilisation systématiques des sépultures, leurs transformations morphologiques, des réductions d'inhumations, des manipulations et déplacements d'ossements ainsi que la présence de différentes typologies de mobilier funéraire, comme par exemple des lampes à huile, des *unguentaria* en verre, des monnaies et des céramiques (Bailey 1980 ; *Atlante* I-II ; Isings 1957 ; fig. 13). De cette pratique résulte une surexploitation des espaces, incluant vraisemblablement des interventions anthropiques post-dépositionnelles visant à réorganiser les inhumations au sein des sépultures individuelles. En effet, des inhumations individuelles et doubles sont rares tandis que des inhumations collectives – contenant entre 3 et 25 individus – représentent la norme.

Les campagnes de fouilles entreprises entre 2016 et 2019 ont permis d'identifier 340 individus au total : 304 proviennent d'*arcosolia*, 35 de *loculi*, et un squelette d'une fosse aménagée dans le sol. L'analyse anthropologique a permis de quantifier et d'identifier les différents modes d'utilisation des tombes qui varient fortement en fonction de leur type et leur localisation. Par exemple, la plupart des *arcosolia* correspondent à des tombes collectives ; à l'inverse, la moitié des *loculi* contiennent des inhumations individuelles. Dans les tombes abritant le

plus grand nombre d'individus, il a été possible de mettre en évidence une intensification apparente des inhumations lors de la deuxième phase d'occupation de la catacombe.

Les deux phases d'utilisation de la catacombe ont livré des répartitions et valeurs similaires en ce qui concerne le *sex ratio*, l'estimation de la stature et l'état de santé général des individus adultes. En revanche, elles se distinguent nettement en ce qui concerne la proportion des individus immatures, les différences étant les plus marquées dans la classe d'âge des 1-5 ans. Ainsi, trois fois plus d'enfants ont été inhumés au cours de la seconde phase par rapport à la première phase. Plusieurs facteurs potentiellement combinés peuvent expliquer cet état de fait. Par exemple, cette différence peut être liée à de simples biais liés au caractère partiel de la fouille de la catacombe, à des choix funéraires spécifiques ou encore à un pic de mortalité particulier, probablement dû à des changements concernant les conditions de vie et l'état de santé. L'analyse paléopathologique de l'échantillon fournit également quelques données allant dans ce sens. Ainsi, il a été possible d'identifier quatre cas de scorbut (pathologie liée à un manque de vitamine C) chez des enfants appartenant à la deuxième phase d'occupation et un pourcentage plus élevé de *cribra orbitalia* et de *cribra cranii*, indiquant la présence répandue de maladies liées à des stress métaboliques (Sperduti *et al.* 2021).

La fouille de la catacombe a également permis la découverte du squelette d'une femme âgée d'environ 40 ans présentant une déformation crânienne artificielle (*arcosolium* 28 ; Braconi *et al.* 2021 : 81-83) qui fait partie des modifications de type « annulaire » probablement obtenue par l'application de double-bandages sur la tête de l'individu pendant sa petite enfance (fig. 15). Trois objets en fer ont été retrouvés à proximité : une boucle, la lame d'un couteau ainsi qu'un petit ardillon, appartenant peut-être à une fibule. Leur position le long du corps de la femme indique que celle-ci était habillée au moment de son inhumation. Il est important de noter que la boucle présente des similitudes avec des boucles retrouvées dans des nécropoles en Hongrie et en Allemagne du Sud (Braconi *et al.* 2021 : 68-69). Les indices biologiques et culturels récoltés plaident en faveur d'une origine allochtone de la femme, et rejoignent en ce sens d'autres découvertes de ce type en Italie. En effet, les onze cas de modifications crâniennes enregistrés jusqu'ici sur la péninsule italienne proviennent tous de sépultures datées de l'Antiquité tardive et du Haut Moyen-âge, qui peuvent être attribuées à des groupes d'Europe de l'Est sur le plan culturel. Dans la ville de Chiusi, l'occurrence de quatre de ces cas, dont celui de la femme de la catacombe, est probablement liée à la présence, documentée historiquement, d'une garnison de Goths dans la ville pendant la guerre gréco-gothique (535-554 AD). Le scénario émergent ici mérite des investigations supplémentaires qui vont livrer des informations concernant les types de mobilité et de régime alimentaire ainsi que l'ascendance génétique et la parenté des individus au sein et en dehors de la catacombe.

## 1. Introduction: history of the discovery, previous studies and the new research project

The Catacomb of Santa Mustiola is located around 1 kilometer north-east from the city of Chiusi, close to the SP 49B state road, which at least partially follows the layout of an ancient roadway that led from the city walls to the lake (Bianchi Bandinelli 1925, c. 262-263, tab. IV; Menichetti 1992: 366-367, f. 121, 21-22; Cipollone 1998: 93-96; Borghi 2002: 24, 60-61; *ICI XI*: 3-5). The hypogeum complex, excavated on the southern side of a modest geological relief, seems to have been built starting from a pre-existing funerary settlement of a private client, later enlarged and transformed into a communal cemetery of significant extension, constructed in accordance with catacomb-type funeral systems amply documented in the geographical area of southern Etruria (Fiocchi Nicolai 1988: 365-371; Vella 2010: 24-25; Fiocchi Nicolai 2019: 76-77; fig. 1). This planimetric scheme, which can be better assessed in the other Catacomb of Chiusi, the one of Santa Caterina (Paolucci 1988, 1997), foresees an entrance vestibule, from whose back wall two main arteries originate in divergent directions, in turn intersected by secondary galleries (fig. 2).

The first reference to the complex dates back to the 1600s, when the excavation of a well for the supply of water to the monastery above rendered it possible to intercept certain galleries in the western area, which subsequently underwent a systematic plundering, with the consequent removal of the closing materials of the tombs and their grave goods (Ughelli 1718, col. 585; Gigli 1723: 16; Boldetti 1720: 595-596; Cipollone 1998: 104-105; Faralli 2015: 191-192). Only later, throughout the 19th century, its eastern nucleus was intercepted together with the ancient point of access. The galleries and environments were filled with a clayey sediment, probably of alluvial origin, which had effectively sealed the context (Pasquini 1833: 11 and 13; Pasquini 1831; Cipollone 2000: 53-55; Cipollone 2007: 31-34). Above all, the material found during this second antiquarian period rendered it possible to understand how the catacomb served a rather articulated community, equipped with a stable and organised clergy already at least as of the 4th century, according to that certified by the funerary inscription of Bishop *Lucius Petronius Dexter* from 322 AD (*ICI XI*, 2).

In any case, a more precise chronological definition appeared quite complex, also by virtue of the few observable archaeological indicators. In particular, a substantial quantity of oil lamps, found in direct contact with the closing components of the tombs, seemed to confirm this generic dating to the 4th century AD (Cipollone 1997: 46-63; Cipollone 1998: 93-147; Cipollone 2000: 53-70; Braconi 2018: 557-558; Fiocchi Nicolai 2019: 76-77), whilst more sporadic elements actually suggested a likely frequentation of the cemetery at

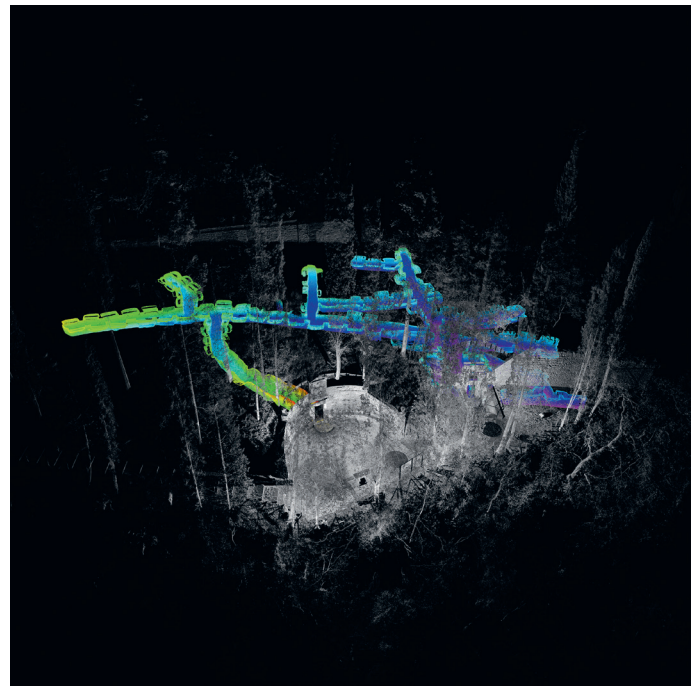


Fig. 1. Chiusi (Si). Catacomb of Santa Mustiola. Laser-scanner relief (ph. PCAS).

least up to the 5th century AD (Pasquini 1833: 13; Liverani 1872: 65; Cipollone 1998: 129-131; Faralli 2015: 191-193). In more recent times, the validity of such conclusions has been ascertained by studies conducted by Valeria Cipollone and culminating in an archaeological investigation carried out at ground level of the double-access vestibule, whilst still uncertain is the most advanced chronological limit within which to collocate the last phases of frequentation for the catacomb (Cipollone 2007: 23-42).

In view of such premises, from 2016 to 2019, a new research project was promoted by the Pontifical Commission for Sacred Archaeology, in collaboration with the Roma Tre University and, from 2018, with the Bioarchaeology Service of the Museum of Civilization. The project aimed at deepening the chronological and fruitive dynamics of the complex, by a systematic stratigraphic excavation. The excavation strategy was designed to reconstruct the horizontal dynamic of expansion and at the same time the vertical chronological sequence by two main steps of analysis.

First, a 3D scan of the entire site was conducted to acquire its layout, which was essential to the analysis of both the construction techniques and the gradual development of the entire structure.

At Santa Mustiola, the initial project had to be modified throughout the course of the ancient excavation when, perhaps due to a collapse, only the westernmost gallery (D) was constructed, with the abolition of Ambulacrum E. Hence,



**Fig. 2.** Chiusi (SI). Catacomb of Santa Mustiola. Plan of the catacomb with the excavated areas (the 'basilichetta' in yellow; gallery B in violet; gallery E in green; gallery F in red; gallery B in orange; gallery I in blue).

rather, the reason behind the anomalous presence of an environment that is roughly quadrangular in shape, located to the north of the small basilica and consistent with it as regards the development on the eastern side of a series of three galleries, plausibly built in different and prolonged points in time with several excavation phases (F, B-C and C1). Similarly, Artery D was also created in two successive phases, the first of which involved an extent of some 18 meters along with the opening on the western side of the initial sections of the orthogonal H and G, with the latter already envisaged, in line with its northern limit, of Offshoot L. Only subsequently, Ambulacrum D was extended by an additional 5 meters, with

the grafting of gallery I, whilst starting from the development to the west of Artery G – with its overall length of 46 meters meaning it is to be considered as a true master gallery – the definitive planimetric layout of the catacomb took shape, with the opening Offshoots M and N and the joining of H with L (Cipollone 1997: 46-63; Cipollone 1998: 93-147; Cipollone 2000: 53-70; *ICI XI*: 3-63; Cipollone 2007: 23-42).

Galleries and tombs to excavate were thus selected according to, beside avoiding interferences by previous investigations, two main criteria: the galleries place in the overall sequence of construction and their spatial relation with what was

conventionally considered the central devotional space, the small basilica. The chosen ones were located in the northern and eastern sectors of the site, in which gallery B, F and Ambulacrum E corresponded to a first phase of construction and corridors D and I to a second one.

Following the 3D scan, the second step was stratigraphic excavation. At the time, all the corridors had already been emptied of their clayey sediment and less than half of the graves still contained their skeletons and grave fills. The excavated graves were either *arcosolia* or *loculi*, as defined by their structural elements, both to be considered 'closed contexts', where it is easy to distinguish between the inside and outside, although in extremely circumscribed spaces.

A sample test of one grave immediately highlighted two main elements: 1) the high density of burials within the same tomb; and 2) the cemetery's multiple re-uses and possible phases. It was therefore necessary to work side-by-side with an anthropologist to obtain a thorough taphonomic documentation and an accurate recognition and retrieval of skeletal individualities and isolated bones.

The grave fills were analytically removed, distinguishing any sort of anomaly: each individual fill could be as small as a single centimetre thick and was oftentimes non-homogenous across the surface of the entire grave. Moreover, it was barely possible to distinguish between the disturbance of the natural agents and man-made interventions. However, it was still fundamental to reconstruct different phases of use, as each fill attested to the limit of one burial and the beginning of a new one or to an interruption. Every layer was dry sieved to achieve the most accurate level of retrievals (both for finds and isolated bone fragments) (Ceci, Santangeli Valenzani 2016), and, when needed, floated and sampled for archaeometric analysis. Skeletons and deposits were all considered together as single, positive layers so as to reconstruct the entire sequence of use of the grave. This attentive removal of soil deposits allowed to better reconstruct the entire life sequence. Moreover, this analytical work, conversely to a synthetical approach, brought, through the careful observation of the soil features, to retrieve wooden coffins and other funerary practices marked by organic elements. The detection of negative layers was less straightforward. Beyond the graves' structural cuts and re-cuts, and the removal of portions of the skeletons – the majority of the other 'cuts' was barely discernible. The main criteria adopted were related to the nature and conservation of the positive layers. In this way, it was possible to reconstruct that the flatness of the top of a layer was often not because of a natural horizontal deposition, but instead to the intentional manipulation of the surface for the next burial.

Implementing these steps allowed us to reconstruct the entire sequence of behaviors, from the construction of

the grave to the last use, including multiple re-uses and transformations. These various observations and procedures formed a solid methodology from which we were able to detect the catacomb's many phases of use.

## 2. Archaeological evidence: modalities and times of usage of the sepulchral spaces

The removal of the tombs' closure systems, consisting mostly of reused brick material (Passa 2021: 153–157), rarely replaced by marble elements, has brought to light a consistent clayey sediment both in the *loculi* and in the *arcosolia*, likely being in line with that documented by the antiquaries in the *ambulacra* and in the other rooms of the catacomb and thus to be connected with the same flooding events (fig. 3). The removal of the layer, which had actually sealed the tombs, preserving their contents unaltered, facilitated the detection of a series of complex stratigraphic situations, symptomatic of a peculiar dynamism in the context of the activities of use and reuse of the tombs, with the presence of individuals buried, in some cases up to 10 units and which appear to correspond to two distinct phases of frequentation. The first, and oldest, is connected with the processes of the genesis and development of the cemetery, as part of the activity of construction and acquisition of the tombs, whereas the second and more recent can be traced back to a phenomenon, perhaps even organised, of reoccupation of the previous tombs, characterised by a marked density of burials (Braconi 2018: 551–562; Braconi *et al.* 2021: 53–98).

In the context of the first phase, the *loculi* and *arcosolia* appear duly excavated, with the morphologies of the tombs barely different, yet nevertheless conceived with consistency in respect to the preparation of their closing elements. The *standards of quality* with which the tombs have been used are excellent, with the systematic cleaning of the layers of deposition and the careful maintenance of the structures, as suggested by the cases in which the reopening of the tombs is limited to the first phase of use (fig. 4). Furthermore, although rare, there are cases in which the tombs are occupied by a single individual, in accordance with a phenomenon that appears to be particularly linked to the tombs with more difficult viability, such as the underfloor *loculi*, or the innermost troughs of the *arcosolia* (fig. 5). In fact, single burials are 6 out of 14 *loculi* and 8 out of 50 *arcosolia*.

Alongside the burials with a more standardised typological character, there are some diversifications, as evidenced – for example – by two single-trough *arcosolia* inside which it was possible to ascertain the insertion of a wooden coffin. In *Arcosolium* 40, partially modified for its insertion, the presence of the coffin is highlighted by the iron nails and



Fig. 3. Arcosolium 14a. Clay layer during the excavation. Ph. PCAS.



Fig. 4. Arcosolium 37. Evidence of a single-phase tomb. Ph. PCAS.



Fig. 5. Loculus 10. Evidence of a single deposition. Ph. PCAS.

plates found in relation to those buried in the first phase, as well as by the wall effect generated at the feet. In the same way, the grave of Arcosolium 12 has been enlarged since its first occupation with the insertion of a wooden coffin, regarding which it has been possible to document both the remains of the lid and the lower surface, clearly observable

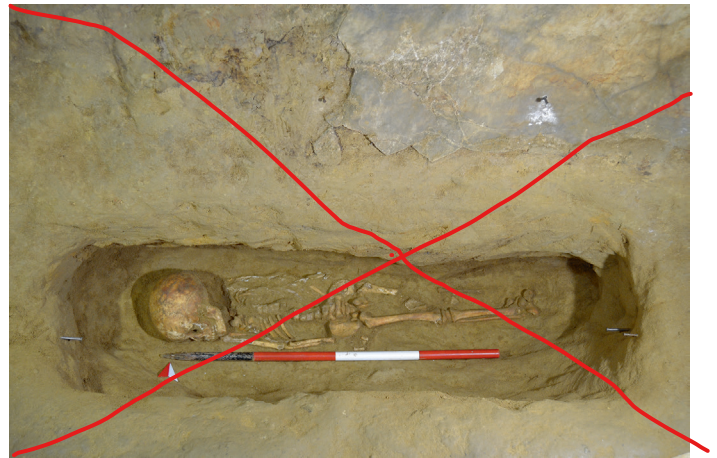


Fig. 5. Loculus 10. Evidence of a single deposition. Ph. PCAS.



Fig. 6. Arcosolium 12. Iron elements pertaining to a wooden coffin. Ph. PCAS.



Fig. 7. Arcosolium 14b. Marble cover. Ph. PCAS.

from the unaltered arrangement of the nails and iron plates with which it was assembled (AO-42 I)<sup>1</sup> (fig. 6).

1 From the laboratory analyses conducted by Artelab Srl on the samples taken from the tombs during the excavation, it was possible to trace the wood utilised for the coffin of Tomb A40 to an oak belonging to the

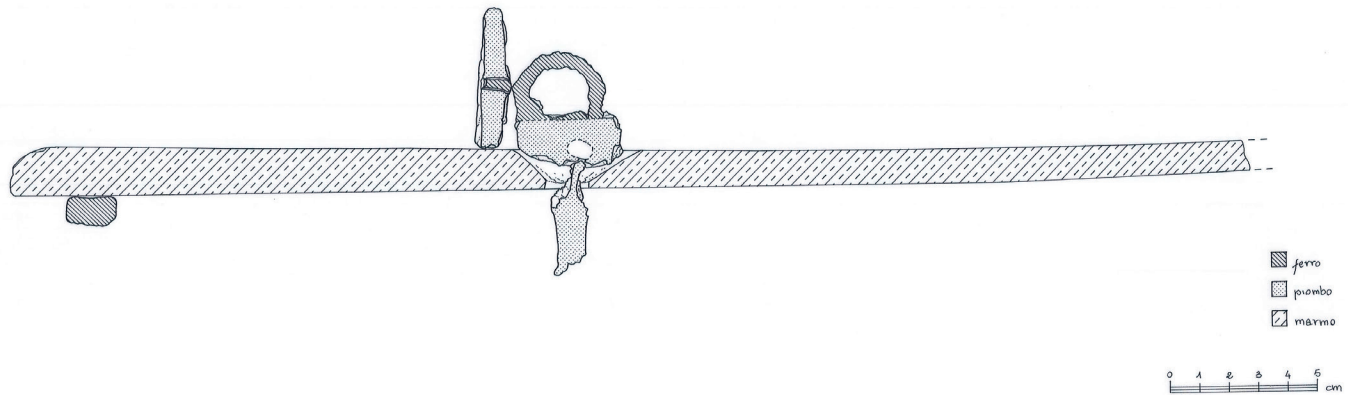


Fig. 8. Arcosolium 14b. Reconstruction drawing of the device for libations. Drawing by Maria Supino for the PCAS.

Moreover, Tomb “b” of the monumental Arcosolium 14 is of particular interest, having been fitted with a closing system with marble slabs, supported by iron brackets placed at regular intervals along the entire length of the grave (fig. 7). The trough, occupied by two adult individuals only during the first phase, retained a libation device in its western border, which saw a hole in the center of the last covering plate, closed by a removable cap in iron and lead, fitted with a counterweight for fastening, whilst a fragmentary olla in raw ceramic was positioned outside, functional to the fulfilment of the ritual (fig. 8). The analyses carried out on the substances recovered inside the tomb have determined the presence of proteins and polysaccharides, perhaps due to a liquid mixture, such as milk and honey, having been poured into it (AO-42 I).

The study of the grave goods found during the first phase of frequentation of the catacomb points to its chronological attribution to the 4th century AD, perhaps with some anticipation to the latter years of the 3rd century. Indeed, to this chronological horizon we can assign the single-handled jug recovered in Tomb “a” of Arcosolium 43, with a vertical lip opening and elliptical handle, a globular body with a low carination and a disc-shaped base, grooved on the bottom which, due to its typology, can resemble the form *Atlante* II, 1/122 (= LXVIII Marabini Moevs 1973 = XLV Vegas 1973). The single-handled jug seems to be almost a constant in the grave goods of the 2nd–4th centuries in Tuscany, as evidenced by the cases of the necropolis of Santa Caterina, also in Chiusi, of Luni, Cosa, Pianosa and Populonia (Costantini 2014). The items in the personal grave goods for the burial of a female sub-adult in Tomb “a” of Arcosolium 17, being extremely simple, allow the dating to at least the beginning of the 4th century AD. The goods consist of a pair of gold earrings with a simple post with a circular profile, with one end slightly pointed and folded twice around the other flattened end to form the eyelet (a hook closure Type 1.a Baldini Lippolis 1999: 68-70) and a fusiform

glass toilet bottle, referable to the typology Isings 1957, f. 105 (= De Tommaso 57 = Morin-Jean 32). A vitreous container of the same type and of similar dimensions was recovered in Tomb “a” of Arcosolium 14, also in this case in the skull area. A recent chronological revision of this typology, attested almost exclusively in the funerary context, allows us to establish its diffusion between the end of the 3rd and the beginning of the 5th century AD (Foy 1995: 191; Manniez 1996-1997).

Finally, a bronze half-follis was found in Arcosolium 35, having been coined in the Ostia mint between 309 and 312 AD (RIC VI, Ostia 60) and issued by Emperor Maxentius, reused as a pendant – even though it is not possible to establish the exact time interval between the period of circulation and the moment of burial – constituting a significant chronological term.

Nonetheless, most of the finds according to the stratigraphic sequence assignable to the first phase of utilization of the burials consists in oil lamps, in particular late imitations of *Firmalampen* belonging to the Buchi X/b type, widely documented in the Chiusi area and characterised by the presence on the base of a radial stamp or by the *Vibian*[i] trademark, copied for *surmoulage* and often difficult to read, as is the case for the later variants (Brando 2015: 134-135). For these artifacts, which constitute an imitation or a continuation by local producers with respect to the traditional northern Italian models of the *Firmalampen*, dating to between the end of the 3rd and 4th centuries AD could be justified (Faralli 2015: 191-192; Costantini 2014: 109; Braconi 2018: 553; for a chronological advancement in a 5th century context, see Brando 2015; fig. 9).

Moreover, such chronological indicators perfectly coincide with those given by an analysis of the materials recovered during the excavation campaign carried out in the years of 2003–2004, in the context of which were found, specifically, the bronze coin of Aureliano (273 AD), Diocletian (290–305 AD) and Licinio (314–315 AD), a bottle (Isings 1957, f. 133) and a

Turkey oak section (*Quercus cerris* L.), whilst that of Arcosolium 12 hails from the species of the common cypress (*Cupressus sempervirens* L.).



Fig. 9. Arcosolium 26a. Imitation of Firmalampe (typology Buchi X/b). Ph. PCAS.

unguentarium (Isings 1957, f. 101) made of glass and also imitation *Firmalampen* lamps associated with the Buchi X/b typology, suggesting a phase of installation and development in the 4th century (Cipollone 2007: 42).

As regards the second phase, the start of the new use of the tombs is constantly documented, starting from a clear stratigraphic distinction, mostly corresponding to an operation for levelling the previous burials, through the addition of sandstone and the displacement of the bones of those buried in the first phase (fig. 10). For this latter aspect, particular attention is paid to the placement of the most voluminous bones, with specific regard to the skulls, which often appear repositioned in order to reduce encumbrance for the arrangement of the new depositions (fig. 11). In any case, these are obviously qualitatively inferior fruitive processes compared to those of the first phase, so much so that the presence of intrusive materials in these intermediate strata is frequent, such as fragments of oil lamps, bricks, rocks and consolidated mortar, to be attributed mostly to the actions of reopening the tombs, during which such items fell inside, never to be removed.

In some cases, the division between the first and second phase is represented by even more solid stratigraphic evidence, such as that of Arcosolium 36, where – amongst the various levels of occupation – the presence of a limestone

lens, formed by water percolation is documented, or that of Tomb A21, in which an element of its internal marble coating is used as a surface for depositing the first individual in the second phase (fig. 12).

At the time of the new occupation, transformations took place in certain tombs with the aim of increasing the space within the grave, first with minor alterations then with more invasive operations that also involved a macroscopic rearrangement, mostly to support the closing devices – Tomb “a” of Arcosolium 33 was enlarged by moving the internal recess backwards to the point that, in order to reposition the covering tiles, it became necessary to improvise two new support systems, made with reused materials, including a funerary inscription (Braconi 2018: 551-562). In a similar fashion in Arcosolium 12, a structure – consisting of two tiles placed on the side and patched up with fragmentary bricks and pebbles – has been mounted in contact with its innermost wall, useful for creating a surface for positioning the clay elements of the closure.

As for the first phase, the best chronological indicators derive from the accompanying goods which allow us to determine the start of the second period of occupation of the tombs, starting at least as of the first half of the 5th century AD, although certain elements suggest that the dating can be advanced to the last part of the century, if not to the first half of the next (Braconi *et al.* 2021: 66-70).

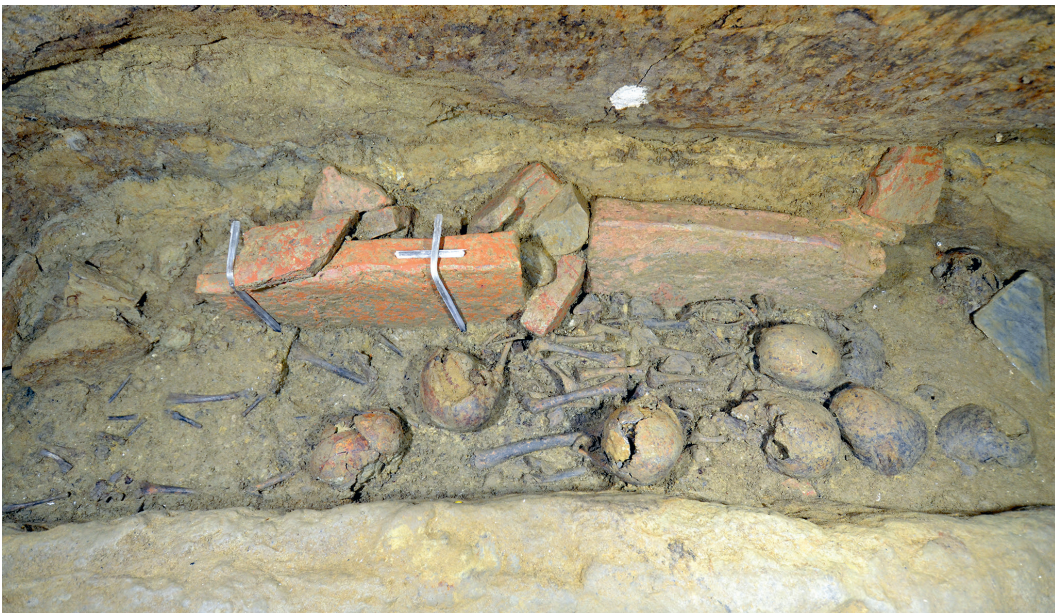
Evidence relating the second phase to the 5th century AD come from Arcosolium 13a in gallery B, where – in connection with the placement of Individual 1 – two ewers were recovered (fig. 13). The first, found near the skull, is of medium size, with a slightly flared lip and circular mouth, a ribbon handle coplanar to the side and set at the maximum diameter, reaching half the height of the body and with a ring foot. Despite having morphological characteristics in line with the first, the second ewer – recovered from the area of the lower limbs – differs from the first in terms of the ceramic body and the decidedly more irregular form. This type of artefact is very common in contexts dating from the 5th century and all throughout the 7th century (Francovich and Valenti 1997; Ciampoltrini 1998) and follows the propensity of an almost exclusive presence in the grave goods of Late Antiquity and the Early Middle Ages of closed containers of medium-small dimensions, usually placed next to the skull of the inhumed person, for which there is an extremely articulated typological repertoire, with the absence of exact replicas of the form, as if not even the memory of the normal practice of production in series was preserved (Baldassarre 1967)<sup>2</sup>. This characteristic

<sup>2</sup> On ceramic production in Tuscany between the end of Late Antiquity and the beginning of the Early Middle Ages, Valenti 1991, 1996, 1999; Francovich, Valenti 1997 and Stasolla, Marchetti 2010, also for interesting





**Fig. 10.** Arcosolium 14a. US 237. Sandstone layer extended along all the tomb surface between the first and the second phase. Ph. **Luca Brancazi.**



**Fig. 11.** Arcosolium 12. US 294: remains of seven skulls of subadult. Ph. **Maura Fadda.**



**Fig. 12.** Arcosolium 21. US 395: evidence of the second phase with the fallen slab used as new depositional level. Ph. **Martina Bernardi.**



Fig. 13. Arcosolium 13a. Deposition of the second phase with two ewers. Ph. PCAS.



Fig. 14. Arcosolium 12. Bailey Sii lamp associated with a deposition of the second phase. Ph. PCAS.

is usually linked to local manufacturing, as Petrographic Analysis and XRF tests also seem to confirm, in identifying a vast area around Chiusi, between the provinces of Siena, Arezzo and Perugia, as where these vessels were produced (AO-42 II).

Even for the second phase of occupation, the lamps are well attested to and provide a significant chronological indicator. Indeed, lamps belonging to the Bailey Sii and Siii types have been found, being imitations of *Atlante* Forms VIII and X, for which a dating oscillating between the first and second half of the 5th century is usually proposed (Bailey 1980; *Crypta Balbi* 2000: 188–189; fig. 14).

Moreover, the same chronological horizon also refers to elements of the goods in glass and metal – beads, general necklace pieces, buckles, earrings and finger rings in bronze – certainly belonging to the phase of burial reuse. Yet, the most

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considerations on the symbolic meaning of the ceramic goods in burials. For certain Tuscan comparisons see, generally, Ciampoltrini 1998, to which are added the materials recovered in the Umbrian area, in particular from Orvieto (Leone 2015: 368) and from the necropolis of Pietrarossa di Trevi (PG) (Albanesi 2015).

eloquent indication undoubtedly comes from the personal goods relating to the burial of a female individual placed in Arcosolium 28, consisting of a small fibula component, a buckle and a knife (fig. 26). These elements, all in iron, together with the characteristic artificial cranial deformation of the deceased, allow the burial to be dated to at least the second half of the 5th century (Braconi *et al.* 2021).

### 3. Anthropological evidence: bio-demographic profile of the individuals

The excavation yielded 340 individuals: 304 from *arcosolia*, 35 from *loculi*, and one from a floor pit. As mentioned above, most of the tombs presented collective burials, with a variable number of inhumations in relation to their type and location. Only 26.0% of the *arcosolia* presented single or double inhumations, all referring to adult individuals. Conversely, the tombs with the highest number of inhumations (more than 10, up to 25 individuals) show the presence of a high proportion of nonadults, and an apparent intensification of inhumations in the second phase of occupation of the Catacomb. Arcosolium 20b, for instance, contains the remains of three adult males in the first phase but of seven adult individuals (both male and female) and of 15 nonadults in the second phase. A similar increase is observed in Arcosolia 16a and 21, and to a lesser extent, in Arcosolium 14a.

The demographic comparison between the two phases has highlighted similarities but also differences. Both phases present comparable numbers of males and females, in line with what expected in a natural population, thus indicating the absence of demographic biases in the living community and of cultural biases in the funerary practices. On the contrary, in the age-at-death composition, the two phases show a high statistical difference, with nonadults doubling their representation from the first phase (28.8%) to the second one (55.8%). The highest discrepancy occurs in the 1–5 y.o. class (table 1), where children of the second phase are three times those of the first one; moreover, their number overly exceeds those of neonates and infants (0–1 year-old). Indeed, these two age classes show a significant underrepresentation in both phases, as the risk of mortality at birth and within the first year of life should have been much higher, in line with what modeled for ancient communities (Coale *et al.* 2013; Weiss 1973). The lack of infants in the formal community burial ground is a relatively widespread phenomenon in past societies, reflecting possible funerary segregation, as also attested in other late antique or medieval sites (Sperduti *et al.* 2018; Lugli *et al.* 2020; Montagnetti *et al.* 2020). This funerary behavior could partially explain the underrepresentation of infants recovered so far in the excavation. However, in consideration of the still partial

investigation of the Catacomb, we cannot exclude that they were placed in a specific area within the complex, perhaps in galleries that have yet to be excavated. If this is the case, Santa Mustiola would differ from the Catacombs of Canosa, which show a high number of neonates that have not been spatially segregated from the other individuals (see De Santis *et al.*, this volume).

As for the over-representation of 1-5 y.o. children in the second phase of occupation of the Catacomb, different non-mutually exclusive explanations can be put forward. One possible factor is the partial excavation of the complex: the data collected so far exclusively refers to a few sectors, and future excavations could lead to a variation in the results. As a matter of fact, we observed significant differences in the presence of 1-5 y.o. children among the galleries: in galleries B, E, F, their percentage was over 30% of the total inhumations, whereas it dropped to 4.8% in gallery D and 0.0% in gallery I. Nevertheless, their high number could also reflect an actual peak in mortality, that could be related to changes in living conditions and health status. In this regard, the paleopathological survey of the sample provides some supporting data. For instance, we recorded 4 cases of scurvy (pathological condition linked to lack of vitamin C) in children from the second phase of occupation and a higher percentage of *cribra orbitalia* and *cribra cranii*, indicating a more widespread condition of metabolic stress affections (Sperduti *et al.* 2021). In contrast, the health indicators of the adults show no statistically significant differences between the two phases (table 2).

The living stature of the adult individuals was estimated by applying the regression formulas proposed by Pearson (1899) on long bone lengths. The mean stature results 151.5 cm in the female sample (N=42; range: 140.3-161.3 cm) and 166.0 cm in the male one (N=31; range:156.4-175.3 cm). The values don't show any differences between the first and the second phase of use of the Catacomb.

#### 4. The case of artificial cranial deformation

Arcosolium 28 yielded the skeletal remains of seven individuals buried in two distinct phases. One of the latest burials refers to an adult woman of ~40 years showing artificial cranial deformation (Braconi *et al.* 2021: 81-83). In its general architecture, the skull appears narrow and elongated in the superior-posterior sense with the most evident modifications on the frontal and occipital bones; the first appears strongly flattened and inclined; the second shows an anomalous compression and verticalization at the level of the squama (fig. 15). The morphological features point to an "annular" type of modification (Dembo, Imbelloni 1938;

	I Phase	%	II Phase	%
neonates	2	1.2	1	0.6
0-1	8	4.7	15	9.7
1-5	13	7.6	40	26.0
5-10	11	6.5	16	10.4
10-15	12	7.1	9	5.8
15-20	8	4.7	6	3.9
20-30	12	7.1	13	8.4
30-40	24	14.1	10	6.5
40-50	24	14.1	12	7.8
50+	10	5.9	1	0.6
generic nonadult	6	3.5	8	5.2
generic adult	40	23.5	23	14.9

Table 1. Age at death distribution by phase of use of the catacomb.

	I Phase	II Phase
Enamel hypoplasia	83.3%	74.2%
Caries and antemortem tooth loss (20-40 y.o)	62.5%	86.7%
Caries and antemortem tooth loss (40+ y.o)	94.1%	84.6%
Bone fractures	43.5%	41.4%
Periostitis	21.4%	32.3%
Degenerative Joint Disease (40+ y.o)	66.7%	45.5%

Table 2. Paleopathological indicators by phase.

Knipper *et al.* 2020) that was probably obtained through the application, in early infancy, of double bandages to the head of the individual<sup>3</sup>. Associated with the woman we found three iron elements pertinent to her clothing: a buckle, the

<sup>3</sup> The intentional cranial deformation represents a deliberate and irreversible intervention on infants to modify their natural shape of the head. It is not an aesthetic practice but an indelible physical marker of status, rank and/or affiliation to a specific class or social group. Head modeling falls in the wide range of body shaping practices that are at the basis of anthropopoietic processes (Remotti 2013).

blade of a knife, and a small barb, perhaps relating to a fibula. Their location along the woman's body indicate that she was dressed at the time of burial. It is worth noting that the buckle typology finds comparison with specimens from necropolises in Hungary and Southern Germany (Braconi *et al.* 2021: 68-69).

The biological and cultural evidence points to an allochthonous origin of the woman, in line with other similar findings in Italy. Indeed, the 11 cases of cranial modifications so far recorded in our peninsula come from late antique or early medieval burials culturally connected to Eastern European groups (see for instance Viva *et al.* 2022). In the city of Chiusi, the occurrence of four such cases (including the woman from the Catacomb) is likely related to the historically documented presence of a Goth garrison in the city during the Greek-Gothic war (535-554 cent. AD). The emerging scenario deserves further investigation to shed light on the nature and degree of the interaction between the local population and the Gothic occupants; in this respect, analyses already in progress will provide insight into mobility and dietary patterns, as well as into the genetic ancestry and kinship of the individuals both within and outside the Catacomb.

## Conclusion

Although the investigation project of the Catacomb of Santa Mustiola is still underway, the body of evidence collected so far allowed the initial assessment of the architectural layout and use of the funerary spaces. The stratigraphic data with the cultural items point to two chronologically distinct phases in the burial of the individuals within the same tomb. The first and most ancient one (between the end of the 3rd and 4th centuries AD) coincides with the construction and organization of the spaces. In contrast, the second one (from the first half of the 5th to the 6th centuries AD) is marked by the re-opening and reuse of the tombs with overexploitation of the spaces. The anthropological analyses of the two phases have detected significant differences in the demographic composition and clues of possible changes in the living conditions of the early Christian community of Chiusi. Finally, we mention the finding of an individual with the artificially deformed skull with personal goods culturally referable to eastern-European cultures. Future excavation campaigns and paleogenetic analyses will clarify whether this is an isolated occurrence or the emerging evidence of a more complex and profound relationship between the local community and allochthonous groups.



Fig. 15. Arcosolium 28. Individual with cranial deformation. Ph. Bioarchaeology Service of the Museum of Civilizations.

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