

Insights into Portuguese Medical History

From the Birth of the Art of Asclepius



Edited by

Maria do Sameiro Barroso
Christopher John Duffin
João Alcindo Martins e Silva

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Medical History

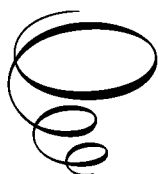
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INTRODUCTION

The rich history of Portuguese medicine, ranging from Neolithic trepanned skulls to the country's unique contribution to the Age of Discovery by introducing the medical knowledge of Eastern *materia medica* into European medicine, has mainly been studied by Portuguese researchers. The 46th Congress of the International Society for the History of Medicine (Lisbon 3-6 September 2018) initiated a resurgence of interest in Portuguese medical history by both Portuguese and foreign researchers; the results of this new wave of research deserve the wider circulation that high-quality publications in English can bring about. The volume *Medical Heritage of the National Palace of Mafra*, published by Cambridge Scholars Publishing in 2021, paved the way for new insightful research. The current volume aims to bring together new studies by combining a Portuguese and international authorship, including medical doctors, geologists, archaeologists, anthropologists, historians and pharmacists, focusing on Portuguese medical history.

This book encompasses historical, epigraphic and archaeological research, exploring the rich mosaic of Portuguese medical history from Roman times up to the twentieth century, finishing with an outstanding medical doctor who was also an archaeologist and Director of the Lisbon National Museum of Archaeology.

The title, referring back to Asclepius, the Greek god of medicine, evokes the Greek influence embodied by the presence of Greek pottery, primarily vases discovered in archaeological excavations (Rocha Pereira, 2010). A tombstone dedicated to Asclepius, supposedly fashioned by a Greek freedman and found in Bracara Augusta, one of the most flourishing cities in the Iberian Peninsula during Roman times, establishes the thread traced in this book from Greek Medicine to that of present day Portugal.

In these times of new pandemics, an urgent reconsideration of the analogous experiences of the past has resulted in a meaningful reassessment and revitalization of the present. This mosaic of Portuguese medical history begins with an essay about the goddess *Salus* by **José d'Encarnação**, exploring the ancestral framework of religious beliefs and seeking appeals for godly cures in Roman funerary epigrams, highlighting the social and political concerns expressed in early times.

Further developing the relationship between archaeology and medicine in the Roman period in Portugal, **Maria do Sameiro Barroso** presents an innovative study of medical surgical instruments from Bracara Augusta. Framed within an archaeological context, this study sketches an overview of prevailing medical and surgical practice in the glamorous Roman settlement located in the present day city of Braga, and devised in the sixteenth century by Archbishop D. Diogo de Sousa, the patron of the Archaeological Museum. A second, complementary chapter on the Bühler-Brockhaus Collection completes an insightful overview of the materials used in ancient medical practice. Rare tools whose original functions challenge interpretation have been subjected to modern study techniques such as radiological investigation.

In an essay exploring ancient medical-religious traditions, **Christopher Duffin** presents an in-depth study of the medicinal use of emeralds—precious stones given special consideration by the Portuguese/Goan physician, Garcia de Orta (c. 1501-1568). Continuing his pioneering work on the use of geological materials in medicine, he provides yet another valuable contribution in an aspect of the history of the *materia medica* which, until now, has received very little attention in the literature.

Returning to the topic of pandemics, **Carlos Lemos and Daniel Nunes** explore Art History as a source providing a novel window into the study of ancient epidemics, focusing on the outbreaks of epidemic diseases and plagues.

Maria do Sameiro Barroso presents paintings and a sculpture of the earliest representations of spectacles in Portuguese Art History and a previously unpublished collection of the earliest spectacles found in Portugal following an overview of the use of magnifying beryls used as visual aids and the discovery and development of the earliest spectacles.

The socioeconomic disruption and, above all, the high mortality rate caused by the second pandemic of bubonic plague in Portugal were a constant source of concern for the monarchs who reigned from the fifteenth to the nineteenth century. In two detailed and comprehensive chapters, **J. Martins e Silva** considers how plague and other transmissible diseases were excluded from entry via Lisbon harbour and other Portuguese ports by the development of new norms and sanitary regulations exemplified by the lazaretto, health stations and the sanitary park.

Jewish physicians and their often tragic experiences with the court of the Portuguese Inquisition provide some of the most interesting chapters in Portuguese medical history. Jacob de Castro Sarmiento (1690-1762), one of the most outstanding Portuguese physicians who fled to London and succeeded in becoming a Fellow of the Royal Society, is the subject of a

biographical study by **Christopher J. Duffin**. Sarmiento's works included an account of variolation for smallpox, the introduction of Newtonian science in Portugal and a 'secret' recipe of a quinine-containing *Água de Inglaterra* ('Water of England').

Francisco Curate and **Telmo António** present another Jewish physician, Gaspar Lopes Henriques de Chaves (1729-1796), who managed to stay in Portugal and left valuable manuscripts reflecting his everyday activities. The authors investigate his unpublished collections of medical case histories as major sources of knowledge revealing medical practice and the physician's relationships with patients, providing a valuable contribution to the study of medicine in late eighteenth century Portugal.

Pharmacy studies are represented in this book by the chapter contributed by **João Rui Pita, Maria Guilherme Semedo and Ana Leonor Pereira** on the Portuguese physician Bernardino António Gomes (1768-1823), who isolated cinchonine from cinchona bark, engaging the French scientists Pelletier and Caventou in the study. Gomes stimulated the isolation of quinine, the alkaloid which was the mainstay in malarial treatment until the mid-twentieth century.

In a study of modern viral pandemics, **António Trabulo** recalls the catastrophe triggered by the Pneumonic Influenza (Spanish flu) of 1918-1919, focusing on the experiences and implications of the disease in Portugal, evoking Amadeo de Souza Cardoso (1887-1918), one of the most illustrious Portuguese contemporary artists, taken away by the virus.

The exciting topic of female physicians in the History of Medicine is the subject considered by **Dana Baran**, who presents an overview of the life of Maria Ropala Cickersky (1881-1973), the first female forensic physician in South-Eastern Europe and one of the earliest worldwide. Her personality and scientific work did not go unnoticed in Portugal. In 1936, the Portuguese assistant professor Carlos Ribeiro da Silva Lopes, from the Porto Faculty of Medicine and Institute of Forensic Medicine, emphasised a leading paper on the subject by Maria Ropala.

The volume is completed by the contribution of **Carolina Moreira** who considers Fernando de Almeida (1903-1969), a Portuguese gynaecologist and obstetrician, professor of the Lisbon Faculty of Medicine of Lisbon, who made a significant contribution to Neurology and research in collaboration with Egas Moniz (1874-1955), in the discovery of cerebral angiography. Fernando de Almeida also graduated in Historical and Philosophical Sciences, embarking on a highly successful new career in History and Archaeology, leading to his appointment as Director of the Lisbon National Museum of Archaeology, a post which he held from 1967-

1972, proving that a medical doctor can extend his cultural interests far beyond Medicine.

In short, this volume shows that the History of Medicine represents a confluence of multiple arts and sciences. The practice of Medicine is as complex as the human soul. Since ancient times, science has sought to elucidate the secrets of the human body through the dedication, shrewdness and wit that allowed the establishment of a system of medical reasoning based on empirical observation. *Tradition of Medicine*, also referred to as *On Ancient Medicine*, one of the earliest *Hippocratic writings* dating from the end of the fifth century BC, is surprising for its topicality:

Medicine has for long possessed the qualities necessary to make a science. These are a starting point and a known method according to which many valuable discoveries have been made over a long period of time. By such a method, too, the rest of the science will be discovered if anyone who is clever enough is versed in the observation of the past and makes the starting point of his researches (Hippocrates, *Tradition in Medicine* in Lloyd 1894, 71).

Science and empathy stand as two leading characteristics. The ability to understand and share the feelings and emotions of other people, particularly during times of ill-health is the most fundamental, vital essence original to the development of Medicine, as stated by Sir William Osler (1849–1919), one of the most brilliant physicians, sometimes known as ‘The Father of Modern Medicine’: *Medicine arose out of the primal sympathy of man with man: out of the desire to help those in sorrow, need and sickness* (Osler 1921, 6).

Citing Hippocrates (460-370 BC), Sir William Osler views the history of empathy as a complementary discipline of clinical medicine: *Where there is love of humanity there will be love of the profession* (Osler 1921, 62). Ultimately, cultivating an understanding of the past, the history of empathy is at the core of the History of Medicine.

Maria do Sameiro Barroso
Christopher J. Duffin

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CHAPTER 2

ROMAN MEDICAL-SURGICAL INSTRUMENTS FROM THE ARCHAEOLOGICAL MUSEUM D. DIOGO DE SOUSA, BRAGA¹

MARIA DO SAMEIRO BARROSO

Abstract

Emperor Augustus (reigned 27 BC-14 AD) founded Bracara Augusta in 16 or 15 BC. The name derives from local indigenous peoples, the *Bracaros*, and Emperor Augustus. The Roman town, considered to rival other outstanding Roman capitals like Hispalis (currently Seville), is still awaiting thorough excavation. This essay selects a votive inscription dedicated to Asclepius and Hygeia to introduce the medical collection. The instruments, dated to between the 1st-4th century AD, were discovered at different archaeological sites in Braga and are housed in the Archaeological Museum D. Diogo de Sousa. Most tools rank among the common typologies of medical-surgical instruments from the Graeco-Roman world, some being rare or unique to the Portuguese territory such as a small scalpel handle and a pair of iron bow-scissors, bringing new insights into operations performed during Roman times. Most surgical tools were excavated at the Top of Cidade Hill which comprised buildings associated with baths and a theatre. Most tools were recovered from the deposits of later settlements, presumably being derived from the bath facilities. This discovery makes this collection particularly interesting. Only a few surgical instruments have previously been discovered in baths, where surgical operations seemed to

¹ Previous versions of this article we presented: “Roman medical-surgical instruments from the Archaeological Museum D. Diogo de Sousa in Braga” at the *Simposium Internacional Historia de la Cirugía, Ciudad de México 9 y 10 de setiembre 2019; Bracara Augusta — Sob a protecção de Esculápio e Higeia* at III Jornadas Portuguesas de Paleopatologia. A saúde e a doença no passado, 2-3 de Novembro de 2012, Centro de Investigação em Antropologia e Saúde (CIAS) Departamento de Ciências da Vida, Universidade de Coimbra.

have taken place. No associated surgeon's tomb or physician's name has been identified so far. None of the instruments came from a specific medical-surgical context. Grave goods from Via XVII's necropolis include grooming tools, mainly balsamaria, an aryballos and a strigil. This instrument is also a medical device, whose function and symbolism in funerary contexts is reviewed.

Keywords: Bracara Augusta; Ancient surgical instruments; Roman baths; strigil; funerary practices

Resumo

O imperador Augusto (reinou de 27 a. C.-14 d.C.) fundou Bracara Augusta em 16 ou 15 a. C. O nome deriva dos povos indígenas locais, os Bracaros e do nome do imperador Augusto. A cidade, considerada rival de outras importantes capitais romanas como Hispalis (atualmente Sevilha), ainda aguarda escavações completas. Para este estudo, selecionámos uma inscrição votiva dedicada a Asclépio e Hígia para apresentar a colecção médica. Os instrumentos, datados entre os séculos I e IV d.C., foram descobertos em diferentes sítios arqueológicos de Braga e encontram-se no Museu Arqueológico D. Diogo de Sousa. A maioria insere-se nas tipologias comuns de instrumentos médico-cirúrgicos do mundo greco-romano. Algumas peças são raras ou únicas no território português, como é o caso de um pequeno cabo de bisturi e uma tesoura em ferro, o que acrescenta um novo conhecimento sobre as operações realizadas durante a época romana. Grande parte dos instrumentos surgiram em escavações no Alto da Colina da Cividade, constituído por edifícios associados a termas e a um teatro. A maioria das peças foi recuperada dos depósitos de assentamentos posteriores, presumivelmente provenientes das instalações do balneário. Esta descoberta torna esta coleção particularmente interessante. Apenas alguns instrumentos cirúrgicos foram descobertos anteriormente em complexos termais, onde as operações cirúrgicas parecem ter sido praticadas. Nenhum túmulo de cirurgião associado ou nome de médico foi identificado até agora. Nenhum dos instrumentos surgiu de um contexto médico-cirúrgico específico. Espólios funerários da necrópole da Via XVII incluem objectos de higiene, principalmente balsamários, um aríbalo e um estrígilo. Este é também um instrumento médico, cuja função e simbolismo em contextos funerários revemos neste estudo.

Palavras-chave: Bracara Augusta; Instrumentos cirúrgicos antigos; Balneários romanos; estrígilo; práticas funerárias

Introduction

The Archaeological Museum D. Diogo de Sousa was founded in 1918. It was a small museum housing archaeological remains from Bracara Augusta and religious and art collections which subsequently underwent many vicissitudes (Oliveira 1986, 171-195).

In 1980 it was revitalized. Its patron D. Diogo de Sousa (1468-1505) (Fig. 2.1) was a remarkable cleric and man of culture. Born in Évora, he studied Theology at the Universities of Salamanca and Paris. On his return to Portugal, he was appointed Canon at Évora (cónego eborense), and King John II (reigned 11-15 November 1477 and 1481-1495) nominated him Dean of the Royal Chapel. He participated in the tribute and obedience embassies to Pope Alexander VI (Papacy 1492- 1503) and Julius II (Papacy 1503-1513). He was Bishop of Oporto and Braga. During his visits to Rome, de Sousa became acquainted with the most elevated humanistic and artistic values of the Renaissance; these inspired his activities in the city where he was archbishop from 1505 until he died in 1532 (Silva 2011, 36-39).

Breaking through the medieval wall, he expanded the city with a building programme, creating new and airy squares that persist to the present day (Torres 2006, 35-44).

By this time, the city had expanded far beyond the Roman Bracara Augusta, appearing on the first map in Georg Braun (1541/2-1622) and Frans Hogenberg's work (1590?) *Civitates Orbis Terrarum*, as *Nova Bracarum Auguste descriptio* together with Olisipo (Lisbon) and Conimbriga (Coimbra) (Braun and Hogenberg 1598). The presumed location of the Roman Forum was on the lower-left corner, according to Morais (*apud* Ribeiro 2015, 59) (Fig. 2.2). The excavation of the Roman town started in 1976 when archaeological remains came to light during construction works in the city of Braga (Lemos 2008, 203-239).



Fig. 2.1. Portrait of D. Diogo de Sousa. Tesouro-Museu da Sé de Braga. Public domain.



Fig. 2.2. *Map of Bracara Augusta in Frans Hogenberg, Civitates Orbis Terrarum, 1594. Public domain.*

Bracara Augusta

Bracara Augusta was founded by Emperor Augustus (reigned 27 BC- 14 AD) at the end of the Cantabrian Wars, around 16 BC, in the areas between the rivers Douro and Cávado, in Roman Gallaecia. The Bracaros, a Celtic tribe, had occupied the place. *Bracas* were the trousers worn by the Celtic population. Diodorus Siculus, an ancient Greek historian from the 1st century BC, described the physical appearance, clothing and religious and war rituals of the Celtic tribes from Gaul, referring to the *Bracas*:

Their garments are very strange; for they wear partly coloured coats, interwoven here and there with divers sorts of flowers; and which they call Bracas. They make likewise their cassocks of blanket-work joined together with laces on the inside, and chequered with many pieces of work like flowers; those they wear in winter are thicker, those in summer ate more slender. (Diodorus Siculus translated by Booth, 1814, vol. II, Book V, chapter II, 315).

Bracae or *Braccae* were not items of clothing exclusive to the Bracaros. Diodorus refers to them as part of the peoples' clothing around Rome, such as the Medes, Persians, Parthians, Phrygians, Sacae, Sarmatae, Dacians, and Getae, Teutones, Belgae, Britons and Gauls. *Braccae* is the same as the

Scottish “brecks” and the English “breeches”. These *Braccae* looked strange to the Romans because they were not part of Roman dress, clearly distinguishing the Greeks and Romans from the other peoples, at least during Republican times. Later, they become more familiar, although never coming generally into use (Smith 1859, 213).

The Roman historian Cornelius Tacitus (56-120 AD) still refers to the Roman general Aulus Caecina Alienus (died in 79 AD) when wearing bracas (Gallic clothes), marching through Italy, as being offensive to Roman clothing standards (Tacitus, *Annales* translated by Moore, 1962, volume II, chapter XX, 192).

Battles between the Gauls and Romans are part of battle field scenes depicted in Roman sarcophagi from the second and third centuries AD. The tradition was initiated in Greek sarcophagi from Hellenistic times with the ‘Alexandre sarcophagus’ decorated with battle scenes of Alexandre the Great (356-323 BC). Roman sarcophagi continued to depict the Romans as guardians of civilization against the Barbarians. Roman soldiers wear cuirass while Celtic (and Germanic tribes) wear breeches, as seen in the ‘Ludovisi battle sarcophagus’ from around AD 250–260AD depicting scenes from battles between Roman and Germanic soldiers (McCann 1978, 110-111) (Fig. 2.2).

The Bracaros seem to be the only people named after these pieces of clothing. They were fierce Celtic tribes whose cities (called castros) were first excavated by one of the earliest and most prominent Portuguese archaeologists, Francisco Martins Sarmiento (1833-1899). He unearthed the castros of Citânias de Briteiros and Sanfins in Taipas, near Guimarães.

The discovery of pre-Roman settlements complemented the descriptions provided in the accounts of Strabo (63 BC-23 AD), the Roman geographer, providing detailed knowledge of the indigenous peoples living there (Espelosín 2007, 250-271). Concerning the names of the inhabitants in the inscriptions discovered during the excavations, Camal is the name of the chieftain of the warriors who did not know the meaning of fear (Vasconcellos 1885). Trousers would have been suitable for their riding activities. The wearing of trousers from the 1st millennium BC by the nomadic Scythians, originally from the steppes of Eurasia, was associated with horse riding (Clutton-Brock, 1992). Trousers were part of the rider’s equipment, benefiting the adhesion between horse and rider and protecting the perineum and the horsemen’s lower limbs, especially when spending much time on horseback (Barroso 2020, 1-6).

Roman authors like Strabo wrote about the Celtic tribe from the Northwest of Portugal, recounting how they slept under the stars and sacrificed bulls, singing prayers, praising the light and creation as simple,

uncultured exalted devotees, fulfilling the rituals to their deities in their plenitude of worshippers of the sun (Espelosin 2007, 260).



Fig. 2.3. Detail from the ‘Ludovisi battle sarcophagus’ or ‘Grande Ludovisi’ sarcophagus. Ludovisi Collection. Rome. Public domain.

José Leite de Vasconcellos (1851-1941), another prominent Portuguese archaeologist, founder of the National Museum of Archaeology in Lisbon, also medical doctor, linguist and poet, was a close friend to Martins Sarmiento. He was very enthusiastic about Sarmiento's findings, and recreated the everyday life of this tribe in a poem, bringing their story to light, as he states in the ending lines of a poem written on 26 June 1881, at the foot of Citânia de Briteiros:

However, later on, I, as light of wit,
Will spread sacred flashes in the dark...
And Science will bring you to life
Oh, barbaric soldiers!²

The second name of Bracara Augusta derives from “Augustus”, the given name of Emperor Augustus; the word means venerable, majestic, and consecrated by the augurs. Augustus embodied the noblest rites that presided over Rome's foundation as referred to by the celebrated poet Quintus Ennius (239-169 BC), as “renowned Rome was founded by august auguri” (Ennius, *Annals*, fr. 468-469 in Warmington 1935, vol. I, 177).

Bracara Augusta was also found in a sacred place often struck by lightning. Such practice was related to the cult of Jupiter, the god of the sky, thunder and the king of Roman gods. The city was devoted to the cult of the divine Emperor Augustus (Morais 2010, 15), reaching its maximum extent in the 2nd century AD (Morais 2010, 7). Bracara Augusta was counted among the four most magnificent cities by the Roman poet Decimus Magnus Ausonius (310-395 AD) in his book *Ordo Urbium nobilium* (*The Order of Famous Cities*):

After these thou shalt be told, beloved Hispalis, name Iberian, by whom glides a river like the sea, to whom all Spain subjects all magistrates. Not Cordova, not Tarragona with its citadel contends with you, nor wealthy Braga, lying proudly in her bay beside the sea. (Gerald, Hugh, Evelyn-White (trans.) Ausonius, *The Order of Famous cities*, vol., chapter XI-XIV, 1919, 277).

² Porém, mais tarde, eu, luz da inteligência,/No escuro espalharei clarões sagrados.../E há-de ressuscitar-vos a Ciência,/Ó bárbaros soldados! Vasconcellos 1885. English translation by the author.

Remains of the cult of Aesculapius in Bracara Augusta

1. Votive wall shrine

A votive wall shrine with an inscription dedicated to Asclepius and Hygea, the Greek names of Aesculapius and Salus, was found on the wall of a 16th-century house on D. Afonso Henriques Street, according to Rigaut de Sousa (Rigaut de Sousa 1978, 20). It was housed at the Biscainhos Museum until 16 December 1993. The capital and the base are very much deteriorated. Even so, ornamental traces are still visible in the pediment (Fig. 2.4a). Vasconcellos referred to this votive shrine as having been included in Aesculapius' cult in Rome settled by Greek freed men (Vasconcellos 1913, 164-65). In Rome, the *medicus* was frequently a slave or a freed man of Hellenic origin, and not a citizen of free origins (Alonso 2018, 119-137). The cult of Aesculapius was introduced into Rome in the 3rd century BC following an outbreak of plague. Asclepius had travelled in the form of a serpent, arriving by ship to Tiber Island where the first shrine to the Roman god Aesculapius was built (Künzl 2002, 24). Sextus Pompeius, Festus, a grammarian of the second century AD who copied fragments of the work *De significatione verborum* by the earlier grammarian Marcus Verrius Flaccus (c. 55 BC-20 AD), explained the reason for the choice of this place and highlighted some of the characteristics of Asclepius's cult, namely, the reasons for the presence of serpents and dogs in Asclepius' (Roman Aesculapius) cult:

To Asclepius on the island [*sc.*, in the Tiber] a temple was built because sick people are aided by physicians particularly through water. The serpent is the guard of this temple because it is a most vigilant beast and his faculty is especially appropriate in safeguarding the health of invalids. Dogs are also used in this temple because he was nourished by the teats of a dog. He has a gnarled staff which signifies the difficulty of his art. He is crowned with laurel because this tree is full of many remedies. To him hens were sacrificed (Festus translated by Edelstein & Edelstein 1998, 361-362).

The great Roman encyclopaedist Plinius the Elder (23/24-79AD) pointed out the therapeutic effects of snakes by applying their entrails to help heal their bites. The healing properties of snakes could be the reason why they were sacred to Asclepius:

Moreover, many remedies are believed to be obtained from a snake, as I shall report in proper order, and this is why it is sacred to Aesculapius (Pliny *NH* Book XXIX, Chapter XXII. 71, translated by Jones in Henderson 1963, 231).



Fig. 2.4a. Votive shrine wall of granite dedicated to Asclepius and Hygea by Marcus. H. 780 mm Max Width 380 mm. 2nd/3rd century AD. Inv. Nr. 1992.0686. Photo credit: MDDS/Manuel Santos.

Fig. 2.4b. Handle with dog's head decoration. Copper alloy. L. 41 mm W. 14mm. 2nd century AD. Inv. Nr. 1992.0686. Photo credit: MDDS/Manuel Santos.

2. Handle decorated with dog's head

A handle decorated with a dog's head was discovered at the excavations in D. Afonso Henriques Street, located near the cathedral in the medieval town. The handle may have belonged to an object associated with the cult of Aesculapius or it might belong to a surgical instrument. Figure representation is rare on surgical instruments (Fig. 2.4b). The outstanding medical doctors and medical historians Theodor Meyer-Steineg (1873-1936) and Karl Sudhoff (1853-1938) reproduced a bronze scraper from the Hellenistic period decorated with a small figurine of Asclepius (Meyer-Steineg and Karl Suddhoff 1921, 90 fig. 55). Seven scalpel handles decorated with the bust of Heracles have been recovered, most from Pompeii.

Entailing labour and suffering, the myth of Heracles was an appropriate decoration for scalpels and other tools associated with pain (Bliquez 2016, 74). The handle may have belonged to a scraper since it presents no hole for insertion of the scalpel blade; it is impossible to make out any other typology because of the fragmentary nature of the specimen.

3. Female figurine

A female figurine discovered at the excavations of Colina do Alto da Cividade also presents challenges to interpretation. Such issues frequently occur with archaeological artefacts, as James Tschen-Emmons explains:

Not everything survives, and so any picture we gain from artefacts is at best an incomplete picture. In recent decades archaeologists have also been keen to preserve as much from archaeological sites as they can, partially in hopes that future techniques will be better than those we possess now. At its best, archaeology is like working on a puzzle where many if not most pieces are missing. We get an idea of the past, but we cannot recover it completely. (Tschen-Emmons 2014, xx).

The figurine was deemed to represent the local deity Tyche (or Cibeles³) or Fortuna, the tutelary goddess of the city, since she wears a *corona muralis* with seven towers, holding an object first identified as a lituus (ritual stick used by the *auguri* to perform divinatory acts) under her left arm. A second crown, possibly belonging to another figurine, was excavated at the same locality (Morais 2010, 15-16) (Fig. 2.5). Giving cities the face of Tyche arises from the Greek habit of personifying cities, peoples and countries with the female figure of tutelary goddesses related to the cult of Tyche or Cibeles.

Young protective goddesses were often depicted wearing a mural crown which replaced the cylindrical polos of the goddess Cibeles (Allègre 1889, 190-92).

The female figure depicted presents an unusual facies. The ugly or unusual body features usually evoke retrospective studies of pathological images. One of these studies of mis-shapening representations collected in paintings, statues, reliefs, and coins in ancient history was carried out by the medical historians Mirko Grmek (1924-2000) and Dannielle Gourevitch (born in 1941). They succeeded in identifying conditions unknown in ancient times, this being the only source of knowledge about their existence. This approach should be complemented by the exegesis of ancient medical

³ Anatolian Mother Goddess.

writings and paleopathology when available (Grmek & Gourevitch 1998, 28).



Fig. 2.5. Female figurine. Max height 70mm Max Width 49 mm 2nd century AD Inv. Nr. 1991.2666. Photo credit: MDDS/Manuel Santos.

The method can be considered when it is clear that the artist seeks to reproduce the model with a reasonable degree of fidelity since the artist would reproduce the pathological traits while observing the model. Manifest manufacturing defects are also excluding parameters. Identifying signs of a condition often leave little or no doubt as to the diagnosis. The medical interpretation of the hypothetical girl-goddess' anomalous face by the neurosurgeon, Dr António Trabulo, was as follows:

The girl depicted in this figurine presents divergent strabismus, possibly by paresis of the right eye's internal rectus muscle, which presents exophthalmos (assuming the normal eye is the left). Besides, the temporal fossae are relatively convex, but not enough to diagnose hydrocephalus. The interorbital distance seems normal, and there is no reason to think about hypertelorism (increased distance between the orbits). The thickness of the wings of the nose may indicate African descent. In short, we observe

unilateral (right) exophthalmos with strabismus, tumour or congenital malformation standing as possible causes.

These facial abnormalities do not seem appropriate for a tutelary goddess symbolizing wealth and prosperity. A healthy face would be expected. Greek and Roman gods were usually depicted at the height of their imperishable beauty.

Further research by Armando Redentor has identified the object under her left arm as a serpent entwined around a rod, proposing the figurine as a personification of the goddess Salus (Greek Hygea) (Redentor 2011, I, 364-365). Morais et al. have hypothesised that the figurine could have been a syncretic deity wearing the crown of Tyche/Fortune combined with iconographic features of the goddess Hygea/Salus as indicated by the coiled serpent (Morais et al. 2013, 66).

Although this interpretation does not explain why she is wearing the mural crown, the relationship with the cult of Aesculapius seems very plausible.

Aesculapius and Graeco-Roman surgery and tools

Graeco-Roman medicine, extending from Hippocrates (460-370 BC) to Paul of Aegina (625-690 AD), the last Byzantine compiler, laid the foundations of rational medical thought, by explaining diseases by natural causes and by developing surgical procedures, mainly confined to the managing of traumatic conditions in earlier proto-medical approaches. As in the Greek world, the Roman Aesculapius continued to be an inspiring figure with characteristics of a humane medicine practitioner, being a reputed physician and surgeon. According to Gaius Iulius Hyginus (64-17 BC), a Roman writer born in the Iberian Peninsula:

Chiron the Centaur, son of Saturn, first created the medical art of surgery after that of herbs; Apollo first created the medical art of ophthalmology; in the third place, moreover, Asclepius, son of Apollo, discovered „bedside“ medicine. (Hyginus, *Fabulae*, CCLXXIV, 9 in Edelstein & Edelstein II 1998, 186).

Marcus Tullius Cicero (106-43 BC), the Roman philosopher, summarized the legends of Aesculapius, and credited him with the invention of surgical materials:

Of the various Aesculapi, the first is the son of Apollo, and he is worshipped by the Arcadians; he is reputed to have invented use of the probe and to have

been the first surgeon to employ splints. (Cicero, *De Natura Deorum* III translated by Rackam, 1933, 341).

Greek physicians started to perform complex operations. Caius Cornelius Celsus (25 BC-50 AD), described a large number of surgical operations in his work *On Medicine*, frequently referring to the instruments used (Celsus, Books VII.VIII, Hendersen, 1938), together with other authors. Claudius Galenus (Galen) (129-200 AD) addressed the situation as follows:

There is an operation for each part of the body, which we employ when we stitch up the eyelids and another completely different one for couching cataracts. There are three or four others bearing no similarity to one another, nor to those by which we cut away fractured bone from the skull, while in another part of the body (for example the arm or the forearm) we reduce and set and bind up fractures. Surgery for hernia is altogether distinct from such operations, just as surgery for varicose veins is from it, and just as the operation for bladder stone is from all those mentioned. For the majority of these interventions, we operate with a scalpel. On the other hand, to anoint the eyes or to reduce limbs or to put plaster on a part or two to employ a catheter properly or to apply a cupping vessel, requires no scalpel. These procedures are also completely distinct from one another and from all those aforementioned (Galen translated by Bliquez, 2016, 1).

In this text, Galen refers to simple procedures like applying cupping vessels or bloodletting, and procedures like lithotomy, a very dangerous surgical incision of the urinary bladder for removal of a calculus, only carried out in an attempt to save the patient's life when no further options remained (on this subject, see Barroso 2020 a, 192-196).

Victor Deneffe (1835-1908), one of the first surgeons devoted to the study of Graeco-Roman medical-surgical instruments, presented an insightful overview of the instruments and the operations performed by Graeco-Roman surgeons (Deneffe 1893, 11-18). Milne also related the mentions and descriptions of such instruments appearing in medical textbooks (Milne 1907). Around 120 different operations are recorded, at different times and places throughout the Roman Empire (Bliquez 2016, 1). Most surviving tools, dating from the 1st-4th century AD, were found either in funerary contexts or in consequence of natural disasters, such as the eruption of the Vesuvius in 79 AD (Künzl 2002, 58). Numerous instruments were found in the House of the Surgeon, currently housed in the Archaeological Museum of Naples. A fire at a physician's house in Rimini in the 3rd century AD also preserved 150 instruments. The house belonged to Eutyches, a military surgeon. Some typologies mentioned in medical

texts such as the spoon of Diocles, devised to extract arrows, have never been found. (Domus Rimini).

Graeco-Roman medical-surgical tools in a funerary context

The study of Gaius Firminus Severus by Deneffe brought to light the relationship between Roman medical surgical instruments and funerary practices. By the end of the nineteenth century, the discovery of the tomb of the ophthalmologist Gaius Firminus Severus in Reims highlighted the practice of ophthalmology in Roman times. It was evident that the physician was most proud of his tools which had elegant decorations, also indicating his prestige and the high social status of his wealthy patients (Deneffe 1896, 12-13).

At that time, knowing nothing about asepsis, the physicians were not aware that decorative embellishments could harbour pathogens and consequently infect surgical wounds. Beautiful instruments, mainly handles (scalpel handles) with silver inlays and damascene decorations have been unearthed in the Roman city of Balsa, currently Tavira (Barroso 2014-2015, 341-373).

Among Gaius Firminus Severus' surgical tools, a fork appeared among the grave goods. Deneffe refers to funerary practices of the Romanized Gauls to figure out the meaning of this finding. Cadavers were cremated, purified by the fire. Bone ash and other remains preserved the eternal memory of the deceased in cinerary urns. The family members placed vases with small glass vessels containing the tears of both relatives and mourners hired for the funeral, together with bottles of perfume as signs of the deceased's memory around the urn. Plates of food and pitchers full of drink were also placed near the urn as travel supplies. At that time, people thought that the deceased would enjoy eating and drinking in the shadow's realm, surrounded by the things he liked when he was on earth. A coin to pay the ferryman, Charon, for crossing the Styx, the underworld river, was also placed in the tomb.

That tradition provides an important tool for dating the objects. The instruments of the profession were placed next to the deceased. Deneffe assumed that the main instruments would be selected: the most elegant, the most beautiful, the ones he cared about the most. There were gold and silver instruments in this tomb that probably were not the ones he commonly used. The fork was placed in the tomb to enable the deceased to consume food on his long journey (Deneffe 1893, 63-64, Pl. 4, Nr.13). Knives and spoons, among other objects, have also been found as grave goods in funerary

practices in Northwest Europe from the 1st to early 3rd century AD (Pearce 2015, 223-248). These findings make it difficult to evaluate knives as surgical instruments.

In Roman times, in general, the deceased expressed pride in their profession in funeral inscriptions or depicted on tombstones. The tombs of *ornatrices*, for example, depicted combs and oil flasks (Kenrick 1858, 25, 29). Objects associated with grooming were depicted on tombstones to highlight the professions of barbers and hairdressers, depicting shears, combs and mirrors, or on tombstones of comb makers depicting combs. Such objects could also be depicted in on the tombstones of private individuals appearing to symbolize female virtue and status (Eckardt & Crummy 2008, 28). Tombs featuring physician's inscriptions date from the 4th century BC, in Greece, up to the 4th century AD throughout the Graeco-Roman world (Künzl 2002, 92).

Scalpel handles, probes, ear probes and tubes belong strictly to the surgical field. Scalpel handles often had the form of leaf-shaped spatulae. The different functions of the two sides of the instruments might have increased their functional range or, as Künzl has hypothesized, made them adaptable and quick to manage in rapid operations performed without anaesthesia and involving high haemorrhagic risk (Künzl 2002, 51).

The following instruments leave no doubt as to the identification of a physician's grave: scalpels, lancets, dental forceps, bone elevators and chisels used in traumatology, as well as trepanation instruments, vaginal speculae, suction cups, cauteries, surgical needles and catheters (Künzl 2002, 35).

Scalpel handles survive preferentially because the blades, made of iron, are easily corroded over time. Probes, spatulae, forceps, and tweezers have frequently been discovered in excavations of Roman archaeological sites. Other implements, such as cataract needles, dental forceps, vaginal and rectal specula, bone levers, hooks, retractors, tubes, chisels, trepaning, lithotomy and embryotomy instruments have been found only rarely. Spatulae and spoon-probes were utilized in the preparation of medicines and topical application. Palettes, scoops and mixing rods are also part of that range of instruments. Bow scissors, tweezers and strigils were used in medicine and toiletry, frequently being found together in funerary contexts; toilet tools, however, are smaller and less elaborated.

Medical-surgical instruments from Bracara Augusta

All the medical-surgical artefacts housed in the Archaeological Museum D. Diogo de Sousa were found in excavations carried out from 1976 onwards.

Most came from Top of the Cividade Hill (Colina do Alto da Cividade), the highest place in the city located near the Forum where a theatre, baths, and a palaestra (area dedicated to the practice of sports) have been unearthed. The baths were built during the early 2nd century AD above an earlier building dating from the 1st century AD. The buildings related to the baths underwent refurbishment by the end of the 2nd and 3rd century. By the 4th century AD, they were no longer functional (Martins 2005, XVII). The theatre, next to the baths, was also built in early in the 2nd century AD. Just one-third of the building has been excavated so far (Ribeiro 2015, 141). Many grooming tools, mainly balsamaria, have been discovered at the necropolis of Via XVII (Lourenço 2012, 69). Just a few discoveries have been made at the other excavated necropolis. Four large necropoleis, located outside the city by the main exits, have been identified:

1- Necropolis of Maximinos at the Via XVI exit (Bracara-Olisipo) near the *Sinistra* Gate, occupying the West and Southwest of the city.

2- Necropolis of Via XVII in the Oriental part of the city, encompassing archaeological findings of the Post-office Building and Av. da Liberdade near the exit of Via XVII (Bracara-Astorga) by *Acqua Flavis*, currently Chaves.

3- Necropolis in the North, Campo da Vinha, connected with the exit either to Via XVIII (Bracara-Astorga) by the current Gallician city of Orense or Via XIX (Bracara-Lucus).

4- Necropolis in the South of the city, following the current Rodovia, corresponds to the exit connecting Bracara and Emerita Augusta by *Egitania*, currently, Viseu (Martins & Delgado 1998, 41-186).

Some instruments were recovered from a series of undifferentiated objects from different periods or dumps belonging to later settlements, making their exact dating equivocal. For this essay, we selected the most outstanding medical-surgical instruments from the Top of Cividade Hill and toilet tools from Via XVII's necropolis for study. The information on the tools, when unpublished, was provided by the files and information of the staff of the Archaeological Museum D. Diogo de Sousa, in collaboration with the Archaeological Department of the Minho University.

1. Scalpel handle (*Scalpellus*)

A tiny leaf-shaped scalpel handle of copper alloy provided with a slot where a replaceable blade was inserted was discovered in a later ditch associated with the abandonment of the theatre amongst a diverse association of material at the Top of the Cividade Hill (Fig. 2.6a).

Most surviving scalpels are similar to this one but larger. Small scalpels suited to eye surgery were relatively small (Bliquez 2016, 79). One such item figures among items belonging to Gallo-Roman ocular physicians (Deneffe 1896, Planche IV, n° 3). This typology is rare. So far, this item is the only one of its type discovered in Portuguese territory.



Fig. 2.6a. Leaf-shaped scalpel handle. Copper alloy. L. 44 mm; Max width 10 mm Inv. Nr. 2000.0672. Photo credit: MDDS/Manuel Santos.
Fig.2.6b. Bow shears. Iron. Width 57 mm. Inv. Nr. 2012.0876. Photo credit: MDDS/Manuel Santos.

2. Bow shears (*Foifex*)

The pair of iron bow shears from Bracara Augusta is the only one known from Portugal to date. It is a well-preserved decorated piece, certainly for

surgical use. The double knot makes it more robust and safer to use. It was found at a similar place as the scalpel-handle, at the Top of Cidade Hill, in a level filling associated with the abandonment of structures post-dating the theatre with Roman and medieval ceramic material (Fig. 2.6b).

Iron shears have been found in the Late Iron Age in Britain and the continent in male graves, with razors and weapons and female graves, being objects for personal grooming. In the Roman period, they appear in funerary context to cut human hair. They consist of pairs of connected separate iron blades each with a rounded handle. Considerable skill was required to operate the two unconnected blades. The twin blades were depicted in a series of tombs up to the 6th century AD. Barbers were proud of these tools which they chose to symbolize their profession (Eckart & Crummy 2008, 35).

Archaeological evidence also supports bow shears as surgical tools. A pair of bow shears is depicted in the relief of a hardware shop at Isola Sacra's necropolis in Ostia (2nd-4th century AD). Little is known about the manufacturers of medical-surgical instruments, this relief being a rare example in which bow shears are depicted among other medical-surgical tools (Künzl 2002, 54, fig. 70).

Iron/steel items have been excavated from the Casa del Medico Novo in Pompei and physicians' tombs in Landenburg, Nijmegen, Merida, Verona, Balçik, and Nea Paphos. They were used to prepare and cut sutures, ligatures, bandages and dressings in operations (Bliquez 2016, 107-108).

Perhaps the greatest risk to life was their use in Celsus' description of the cutting the omentum (a large sheet of fat that stretches over the intestines, liver, and stomach like an elastic apron) ⁴ when managing a perforated wound of the abdomen by a piercing weapon. This was a somewhat audacious procedure, which, retrospectively, is bone-chilling

⁴ On the anatomy and physiology of the Peritoneum, see the following explanation: "Your peritoneum is a membrane, a sheet of smooth tissue that lines your abdominopelvic cavity and surrounds your abdominal organs. It pads and insulates your organs, helps hold them in place and secretes a lubricating fluid to reduce friction when they rub against each other. Your parietal peritoneum lines your abdominal and pelvic walls and your visceral peritoneum wraps around your organs."

<https://my.clevelandclinic.org/health/body/22894-peritoneum#:~:text=Your%20peritoneum%20is%20a%20membrane%2C%20a%20sheet%20of%20smooth%20tissue,they%20rub%20against%20each%20other.>

Accessed 17 August 2022.

because of the high risk of infection and consequent peritonitis leading ultimately to death:

The omentum too must be examined, and any part that is black (dead) is to be cut away with shears; what is sound is returned gently into place in front of the intestines (Celsus Book VII, Chapter 16 translated by Spencer 1938, 387).

The Egyptologist Sir Flinders Petrie (1853-1942) has reviewed metal shears and related objects such as knives, cutters, toilet tools and thread work, reporting rare ornamental specimens of metal shears dating prior to 300 BC, and appearing to be an Italian invention (Petrie 1917, 48 Plates LVIII and LIX).

3. Tube (*Xustra*)

Xustra are hollow conical tubes made of lead, bronze or tin designed to prevent contraction, adhesions and to convey medicines were found in Pompei, matching the descriptions of their use in operations on the rectum and vagina. Smaller tubes were inserted into the nostrils after abstraction of nasal polyps. These small tubes are frequently referred to as lead tubes (Milne 1907, 113-114). Not many of these tubes have survived to the present day. Three bronze tubes were discovered at Pompei (Milne 1907, 113, Plate XXXIX, 1). The hollow copper alloy tube, found in the excavation of São Paulo Street, being 59 mm long, diameter 5 mm, matches this description and is the only one found in Portugal (Fig. 2.7a).

4. Ear probe (*Auriscalpium*)

An ear probe whose handle is embellished with groove and cannellure decoration terminates in a sharp tip it is a particularly beautiful instrument from this collection. It was discovered at the Top of Cividade Hill and dates from the 4th century AD (Fig. 2.7b). Ear probes consist of a small circular scoop at one end and a sharp probe at the other. They were also utilized in eye surgery, as well as removing foreign bodies from the ear canal, and in the treatment of wounds (Barroso 2014-2015, 341-373).

Long thin rods provided with small ear scoop terminals were also utilized in urological procedures to remove bladder-stones from the neck of the bladder (Barroso 2020 a, 192-196).



Fig. 2.7a. Conical hollow tube. Copper alloy. L. 59 mm D. 5 mm. Inv. Nr. 1996.0297. Photo credit: MDDS/Manuel Santos.

Fig. 2.7b. Ear probe. Gilded copper alloy. L. 120 mm D. of scoop 4 mm. 1st half of 4th century AD. Inv. Nr. 1991.2617. Photo credit: MDDS/Manuel Santos.

Fig. 2.7c. Tweezers. Copper alloy. L. 67 mm Width 24 mm. Inv. Nr. 2002.0028. Photo credit: MDDS/Manuel Santos.

5. Tweezers (*Vulsella*)

Small tweezers for cosmetic purposes or larger items with serrated jaws and incurved tips are amongst the most common surgical instruments found (Künzl 1983, 18). They are simple devices consisting of a strip of metal bent in on itself, followed by a straight unit with the jaws turned inwards (Milne 1907, 92, Plate XXVI, N° 3). This is clearly evoked by the item from Bracara Augusta, which matches the description of grooming tweezers (Fig. 2.7c). These were found during the archaeological excavations at Santo António das Travessas Street. Milne reproduced a loop with three grooming objects suspended from it: tweezers, ear-pick and nail-cleaner. He called it a 'pocket-companion' (Milne 1907, 92, Plate XXVI, N° 4). Toilet tweezers and surgical tweezers with beautiful decorations have been recovered from Balsa's Roman city (Barroso 2014-2015, 341-373).

6. Spoon-probe (*Ciathociscomele*)



Fig. 2.8. Spoon-probe with olivary enlargement. Copper alloy. L. 160 mm Max width 10 mm. Inv. Nr. 1996.0547. Photo credit: MDDS/Manuel Santos.

Spatula-probes (*Spathomele*) are long rods with one extremity ending in an olive form and the other in a spatula. Spoon-probes (*Ciathociscomele*) are similar, the spatula being replaced by a spoon. The probe was used to introduce and examine cavities and wounds. The probe frequently had an olive-shaped tip and was used to mix liquids in a container and the spatula to spread the medicines over the affected areas (Milne, 1907, 58). The Bracara Augusta spoon-probe was recovered from the foundation ditch fill of a wall at São Paulo Street and dates from the 4th century AD (Inv. Nr. 1996.0547) The spoon scoop presents a dept groove three moulded rings on the shaft, terminating in the olivary tip, possibly having been used as a dropper (Fig. 2.8).

7. Toilet spoons (*Ligulae*)

Short or long-shafted ear scoops could be used to remove cerumen from the ear channel and extract cosmetics and perfumes from long-necked unguent bottles and apply them to the face or body. They commonly appear in domestic contexts, suggesting they were used mainly for grooming (Eckart & Crummy 2008, 39-40). They were also of medicinal use (Milne 1907, 63). The two specimens from Bracara Augusta present striated decorations of the shaft near the scoop (Fig. 2.9a).

8. Nail cleaner

Nail-cleaners were standard grooming tools but seldom made of bone like the specimen discovered at the necropolis of Via XVIII. A loop and large shoulders topped them, sometimes decorated with a leaf-shaped blade ending in pointed or bifurcated tips (Eckart & Crummy 2008, 121). The implement has broken extremities and bead moulding decorations. A bifurcated nail-cleaner with beautiful decoration, recovered from the excavations of Serpa and a portable set of a nail-cleaner ending in a pointed tip from Moutinho das Laranjeiras are housed in the National Museum of Archaeology in Lisbon (Barroso 2012, 115-122, fig. 8 and 9) (Fig. 9b).

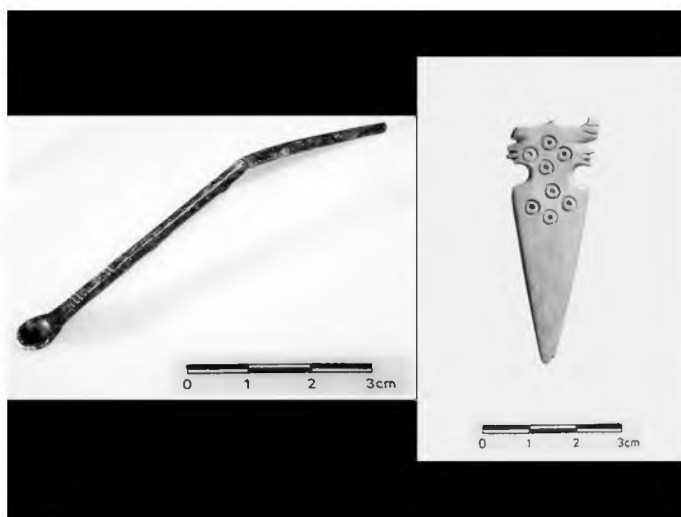


Fig. 2.9a. *Ligula* – Fragmented item, bent shaft and broken tip. Copper alloy. L. 82 mm Diameter of scoop 6 mm. Early 2nd century AD. Inv. Nr. 1998.1551. Photo credit: MDDS/Manuel Santos.

Fig. 2.9b. Fragmented nail cleaner. L. 50 mm W. 15 mm. Bone. Inv. Nr. 2008.0239. Photo credit: MDDS/Manuel Santos.

9. Perfume bottles

Small vessels in various forms, used either to contain oil to hydrate the skin after the bath or to store perfumes, were known as *aryballoi*, *alabastra*, *unguentaria* and *ampullae*. *Aryballoi* possess eyelets at the top and were suspended by a string or chain around the owner's neck, making it easier to

carry to the baths. Olive oil was a common primary ingredient. Rose petals, tree resins such as styrax, cinnamon, and myrrh were popular scents and used medicinally. Selling perfumes was a profitable business, supplying temples, funerary clubs, public baths and general customers. The sellers were called *unguentarii* or *unguentariae*, since many were women (Tschenn-Emmons 2014, 109-112).

Unguent bottles were the most common discoveries of glass in the cinerary tombs of the necropolis of Via XVII (Braga 2010, 89). Cinerary tomb INC100 is particularly interesting from the perspective of the toilet tools it contained, since a green-blue glass *aryballos*, broken at the neck, a blue-green glass unguent/perfume bottle, and a conical body were unearthed from the site along with two ceramic pots. The tomb, dated to the mid 2nd century AD, contained sandy silt, coal, ash and fragmented bones (Braga, 2010, File 35) (Figs 2.10a and 2.10b).



Fig. 2.10a. Blue-green glass unguent/perfume bottle, conical body. H. 165 mm D. 72 mm. Inv. Nr. 2009.0514. Photo credit: MDDS/Manuel Santos.

Fig. 2.10b. Fragmented green-blue glass aryballus. 1st/2nd century AD. H. 89 mm D. 74 mm. Inv. Nr. 2009.0515. Photo credit: MDDS/Manuel Santos.

10. Strigil

Sports were a leading activity in the ancient Greek world. Olympic games were held in honour of the god Zeus every fourth August from 776 BC to 395 AD at Olympia, a grassy plain with shady olive trees, poplars, vines and palm trees to the North of the river Alpheios. The festival, originating in funeral games honouring local heroes, attracted citizens from all over the Greek world. The river provided water for baths next to the *palaestra* framed for the athletes training. The athletes used to anoint themselves with olive oil to protect them from sunburn and accumulation of dust before going out to take part in the competitions. After exercise, they scraped off the oil, dust and sweat with the help of strigils before bathing themselves. Strigils were toilet tools consisting of a blade and handle (Swaddling 1980, 7-9). The athletes used to carry one or more strigils in a loop. They also used to carry an oil flask, the *aryballos*. The oil was sometimes bottled and sold as a medical treatment called *gloios* to relieve aches, pains and sprains (Strigil-Wellcome Image Collection).

The earliest mention of sport-related medicine appears in the manuscripts of Cnidian medicine, the earliest extant writings of Greek medicine (Grensemann 1975, Vorwort vii). Herodicus of Selymbria, a physician from the fifth century BC, is the father of Sports Medicine. He authored a manuscript discovered in 1893, *Anonymus Londinensis* IX 20-26, and his ideas are cited and commented on by later philosophical and medical authors (Grensemann 1975, 15-20; Georgoulis et al. 2007, 315-318). Georgoulis et al. summarized his relevance to medicine:

Herodicus (fifth century BC) is the first person in the history of medicine who actually combined sports with medicine. He used to be a sports teacher, who later studied medicine and managed to succeed Euryphon in the medical school of Cnidos, one of the most prominent in ancient Greece, together with its neighbor medical school of Cos (Hippocrates' home). In Cnidos, Herodicus formed his own theoretical perspective of medicine. He considered, namely, bad health to be the result of imbalance between diet and physical activity and for this reason, he recommended strict diet, constant physical activity and regular training. He believed that this combination was the ideal way to maintain good standards of health, and he applied this type of treatment method to his patients. Unfortunately, Herodicus' works are lost today. (Georgoulis et al. 2007, 315-318).

However, due to insufficient knowledge of pathophysiology in times pre-dating Hippocratic medicine, Herodicus advised great efforts in patients

with fever, which had hazardous consequences, as stated in Hippocratic writings:

Herodicus killed fever patients with running, much wrestling, hot baths. A bad procedure. Fever is inimical to wrestling, walks, running, massage; that is trouble for them. Swelling of the blood vessels, redness, lividness, pallor, soft pains in the ribs. (Smith 1994, *Hippocrates VII, Epidemics 6, Chapter 3. 18*, 243).

Strigils were made of iron or copper and often carried together with oil flasks or *aryballoi*. Strigil blades had sharp edges to ease the scraping process, being curved for collecting dirt, oil and the other substances. They also played a prominent role in athletes' training and cleaning in the larger framework of comradely encounters and entertainment related to the musical and intellectual education provided at the *palaestra* (Eckardt & Crummy 2008, 37).

They have been mostly depicted in Attic red-figure vases related to the homoerotic or heterosexual experiences of the aristocracy, mainly with *hetaerae*, but were also used by women. There are also representations of strigils in funerary vases from the South of Italy (Kotera-Feyer 1998, 107-136). In Roman times, strigils appear in bathing and funerary contexts.

A beautiful transparent glass cup with Snake-Thread decoration, type Isings 85, with broken rim, and ceramic objects: a pot, a plate and an oil lamp, were also part of the grave goods.

A fragmentary iron strigil (the handle is missing) was also found in the cinerary tomb TAVL N° 42 of the necropolis from Via XVII dated to the late 2nd/early 3rd century AD (Fig. 2.11). Strigils, unguent bottles, dishes, cups, bowls and other objects have been discovered as grave goods in Helshoven and Bocholtz, Limburg, the Netherlands in a tomb dating from the 2nd and early 3rd century AD (Pearce 2015, 243-244). Household and grooming grave goods have often been viewed as “evoking the domestic space in tombs considered as eternal homes for the deceased”, according to Pearce (Pearce 2015, 127-238).

Strigils are rare discoveries in Portugal. An incomplete bronze strigil has been excavated from the baths of the Roman city of Conimbriga, near Coimbra. The handle is missing (Alarcão 1994, 129, fig. Nr° 397). The fragmentary strigils from Bracara Augusta and Conimbriga are the only items excavated from Portuguese Roman archaeological sites.



Fig. 2.11. Transparent glass cup with broken rim and Snake-Thread decoration. H. 206 mm D. 77 mm, Late 1st/early 2nd century AD. Inv. Nr. 2009.0419. Photo credit: MDDS/Manuel Santos

Four iron strigils and a small pair of bow-scissors were excavated from tomb N° 2315, dated to the 1st century AD, from the necropolis of Wederath, Belgium (Belgium), a place inhabited by romanized Celtic tribes. A strainer and a sieve of bronze for scooping and cleaning the wine, a ceramic pot and a very blue wine glass cup decorated with spherical motifs in relief, with broken indented rim were also part of the grave goods collection. The choice of these objects surprised the archaeologists who hypothesized that the deceased might have been a medical doctor of Celtic origin who had learned to appreciate body care and Roman wine drinking habits (Haffner 1989, 108-109, fig. 75). The wine glass cup from this tomb is surprisingly similar to the item from tomb 42 from Bracara Augusta.

Artistic representations of funerary rituals have been recorded as *Totenmahlen* (Funerary banquets) since the 6th century BC in the Graeco-Roman world, gods, heroes and unknown men being represented as enjoying the pleasures of the after-life in earthly existence. Typically, a bearded half-nude male figure is represented reclining on a *kliné* (couch), his right hand raising a *rhyton* (conical container in the shape of animal's head), a table before him displaying food, with a woman sitting before him. A serpent and a horse *protome* are also typically depicted together with a cupbearer and servants carrying offerings to the deceased (on this subject,

see Barroso 2016-2017, 201-219). Epigraphic evidence points to the praising of wine-drinking associated with the baths in Roman times such as recorded in the epitaph of Gaius Domicius Primus from Ostia (Italy):

I'm lying in this grave, I, the remarkable Primo. I have eaten oysters, I often drank Falerno wine! Bathing, wine and love have been my company until old age (English translation by the author).

(Hoc ego sum in tumulo Primus notabilissimus ille. Vixi Lucrinis, potabim saepe Falernum, balnia vina Venus mecum senuere per annos.) (Encarnação 2012, 1-12).

Glass strigils also have been discovered in Roman tombs. Their fragility indicates that they were not used in the baths but fabricated as grave goods. A transparent yellowish-brown glass strigil, probably from a tomb, is housed in the Corning Museum of Glass. Five glass strigils were also found in Cologne (Germany) (Whitehouse 2003, 53-54). A glass strigil is housed in the Metropolitan Museum of Art, New York (Fig. 2.12).



Fig. 2.12. Translucent glass strigil. L. 202 mm Max width: 27 mm. 3rd-4th century AD. Metropolitan Museum of Art, New York. Image in Public domain.

Between the 2nd and 4th century AD, strigils also decorated Roman marble vases and sarcophagi. A marble funerary vase, from the Antonin period, decorated with a strigilated pattern and handles in the form of intertwined serpents, substantiates its relationship with harmony after death in the chthonic world (Fig. 2.13).



Fig. 2.13. Marble striated vase with snake handles. H. 175 mm, 2nd half of the 2nd century AD. Metropolitan Museum of Art, New York. Public domain.

Besides their primary function in hygiene care, strigils are medical-surgical instruments, being used to heat medicines and frequently applied to the ear and to stimulate an area of the body by rubbing (Bliquez 2016, 146). For Celsus, the strigil was the tool of choice when managing severe ear inflammation:

It is desirable also to pour some medicament into the ear, and this should always be made lukewarm beforehand; and it is best dropped in from a strigil (Celsus Book VI, Chapter 7 translated by Spencer 1938, 229).

Caelius Aurelianus advised scraping the body with a strigil and dry massages as recovering manoeuvres in abdominal conditions (Drabkin 1950, Caelius Aurelianus, *On Chronic Diseases* IV, 881). Galen highly praised physical exercise and hygiene in preserving health, as stated in his book *Hygiene (De Sanitate Tuenda)*:

But I have shown this in my works, and that those who were before continuously ill have kept free from disease by observing the rules of hygiene: this I show I have undertaken to write. For some I have forbidden to exercise at all, even with the most suitable exercises, wishing them to be satisfied with only the activities essential to life. And others, I have ordered to restrict the quantity of their exercise, in order to reduce the total to a minimum; and others to change merely the quality, or the order, or the time of their exercise; and others to change their entire regime. A similar giving precepts about baths, as not to bathe at all, or more than before, or less, and before meals only, or after meals, or with warmer water than before, or more

tepid, or colder, I have kept patients completely free from illness for many years. (Green, 1951, 187-188).

Nevertheless, he was aware of the hazardous consequences of overtraining:

Now, ulcerative fatigue (for we must begin with this) produces an annoying sensation on movement, as if the body were ulcerating, either the skin alone, when it is more moderate, or the underlying flesh, when it is more severe, or both together, when it is extreme. This is the fatigue symptom. Both the fatigue condition, on which the symptom is based, is an acidity of the thin and warm fluids, which erode and prick and sting the body. And this occurs sometimes from excessive exercise, as was shown in the book before this, and sometimes from some faulty secretion which has occurred without our realization. (...) (Green, 1951, 145-146).

We currently identify the acidity to which Galen refers to as an extremely low pH in the bloodstream caused by lactate build-up (especially L-lactate), provoking lactic acidosis when overtraining. Lactic acid is a by-product of energy-releasing anaerobic glucose metabolism and a waste product that leads to impairment of the body's oxidative metabolism, provoking muscle fatigue and soreness, and eventually the formation of microscopic muscle tears (on this subject, see Hargreaves 2020, 817-828).

Strigils appear as a symbol of balance and well-being associated with a healthy lifestyle and reliable preventive medicine support. In iconography, are highly emblematic symbols of the medical profession in antiquity.

In the strigilated sarcophagus from Ostia, dating from around 300 AD, the Greek physician is depicted with his scrolls (books), his basin for bleeding patients and his surgical instruments (Fig. 2.14).



Fig. 2.14. Sarcophagus with a Greek Physician. Marble. H. 213 mm L: 215.6 cm) Early 300s AD. Metropolitan Museum of Art, New York. Public domain.

11. Probe

An instrument resembling a syringe, or a syringe plunger (although the ringed shaft looks unlikely for that purpose) presents a most challenging interpretation (Fig. 2.15). It was recovered with items from different chronologies from the archaeological site of Fujacal, dating from the 4th century AD or later. This site encompassed an occupation period from the 4th century, when the Roman Wall of Bracara Augusta was erected, until the High Middle Ages (Pereira 2018, VII). Just one metal syringe from the Roman world, a *Pyoulcos*, has been excavated in Paphos, Cyprus, currently housed at the Archaeological Museum of Paphos (Bliquez 2016, 217-218).

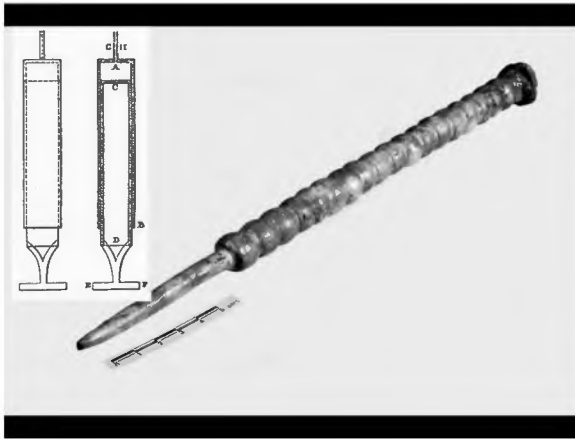


Fig. 2.15. Probe. Bronze. 4th century AD or later. Inv. Nr. 1998.1580. Photo credit: Manuel Santos. Entailing: Drawing of a metal syringe by Hero of Alexandria's *Pneumatics*.

Evidence supports knowledge of metal piston syringes in the Graeco-Roman world. Hero of Alexandria (10-70 AD), the Greek mathematician and engineer, described the device in his book *Pneumatics*:

The instrument called a pyoulcus acts on the same principle. A hollow tube, of some length, is made, A B (fig. 57); into this another tube, CD, is nicely fitted, to the extremity C of which is fastened a small plate or piston, and at D is a handle, E F. Cover the orifice A of the tube A B with a plate in which an extremely fine tube, G H, is fixed, its bore communicating with A B through the plate. When we desire to draw forth any pus, we must apply the extreme orifice of the small tube, H, to the part in which the matter is, and

draw the tube C D outwards by means of the handle. As a vacuum is thus produced in A B something else must enter to fill it, and as there is no other passage but through the mouth of the small tube, we shall of necessity draw up through this any fluid that may be near. Again, when we wish to inject any liquid, we place it in the tube A B, and, taking hold of E F, depress the tube C D, and force down the liquid until we think the injection is effected (Woodcraft 1851, 80).

According to Lawrence Bliquez, Galen gave notice of the existence and use of the *pyoulcos* and reported on its manufacture according to Hieron's planning (Bliquez 2016, 217-218). The *pyoulcos* was used to aspirate liquids. A pig bladder was usually used to inject fluids by inserting a tip into the cavities (ear canal, uterus, anus). Dr Carlos Prates, a radiologist with expertise in Paleoradiology and principal chief radiology researcher of the Egyptian mummies from the National Museum of Archaeology in Lisbon (Lisbon Mummy Project), carried out a radiological study of the device. His report excludes the possibility of the device being a syringe or syringe plunger:

Radiographic study of FEA12100277 - Elongated, ringed and pointed end piece from the Archaeological Museum of Braga D. Diogo de Sousa by Digital Radiography and CT Scan (figs 9, 10): Massive metallic piece, 27.3 cm long. Its density is very high at CT scan and reaches the measurement maximum (value of 3.071 U.H., limit value of the equipment for medical measurement) suggesting a probable bronze, copper and tin alloy. By this method, it seems homogeneous. However, in X-rays, it appears to consist of two components (artefact? - are we working with very high/real densities? See photo below) - a central metallic and very dense axis, varying in diameter harmoniously in its ring components, between 8 and 11 mm, as if by juxtaposed spheres, but without any identifiable separation between them. The termination extends, in continuity, by a pointed axis equally dense and elongated, with about 26 mm, but that is continued by another material, from this distance, very fragmented. Peripherally there is a less dense layer (it looks original, but we must consider a component of restoration material), which mirrors the same central annular shape, without identifiable separations and here with peripheral diameters ranging between 10 and 15 mm. It continues at the tip and most pointed area (through the piece outer lining), exhibiting a total length of about 7.4 cm. Its 2/3 distal are very fragmented and restored. There is a superficial loss of material from the fifth to the ninth ring, with further repair starting from the base.

Between the base and the first ring, the third and fourth rings, there is an irregular crack of transversal repaired fragmentation. At the base, the opposite end of the tip, we observe a flattened finishing component as if with a "lid" of lowest density, slightly broader with about 19.5 mm diameter. It thus appears to be a piece of unique construction with a very dense core, and

with no internal cavity. Therefore, it is a piece of undetermined functionality (a probe or a piece for enlargement of any cavity, not necessarily medical? Veterinary? Or another type of work tool? Nevertheless, excluding the possibility of being a syringe (Carlos Prates / IMI-art / Affidea / Lisbon, 24 Nov 2019). (Fig. 2.16)

Since the device is not hollow, the possibility of it being a syringe or syringe plunger, which would also be hollow, is excluded. The instrument could be a probe, although no parallel seems to be found in human medicine, as far as we know. Veterinary surgical instruments look much like regular medical tools, except for the castration forceps used in the castration of horses and bovines which are specific to use in animals. Larger probes for the examination of wounds have been discovered (Künzl 2002, 75). Until some parallel can shed more light on this tool, we can only speculate as to its function.

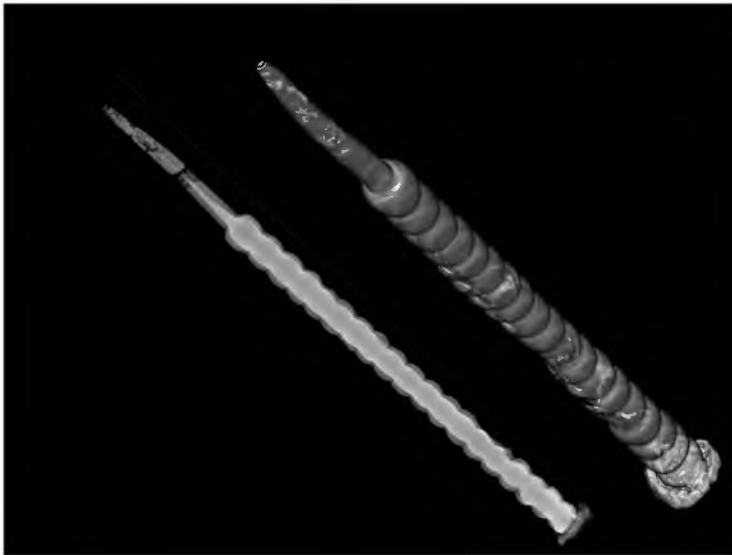


Fig. 2.16. Digital radiology and CT scan of the probe Inv. Nr. 1998.1580. Photo credit: IMI-art / Affidea.

The following table summarizes the tools as regards provenance and collection information.

Instruments from Bracara Augusta

Inv. Number	Instrument	Provenance	Material
1992.0686	Decorated handle ending in form of the dog's head	D. Afonso Henriques Street	Copper alloy
1991.2666	Bronze figurine	Top of Cividade Hill	Bronze
2000.0672	Leaf-shaped scalpel handle	Top of Cividade Hill	Copper alloy
2012.0876	Bow shears	Top of Cividade Hill	Iron
1996.0297	Conical hollow tube	São Paulo Street	Copper alloy
1991.2617	Ear probe	Top of Cividade Hill	Gilded copper alloy
2002.0028	Tweezers	Santo António das Travessas Street	Copper alloy
1996.0547	Spoon-probe with olivary enlargement	São Paulo Street	Copper alloy
1998.1551	Ligula	Top of Cividade Hill	Copper alloy
2008.0239	Fragmented bone nail cleaner	Necropolis of Via XVII	Bone
2009.0514	Blue-green unguent/perfume bottle	Necropolis of Via XVII	Glass
2009.0515	Fragmented green-blue aryballos	Necropolis of Via XVII	Glass
2009.0419	Cup with Snake-Thread decoration	Necropolis of Via XVII	Transparent glass
2009.0417	Strigil with broken handle	Necropolis of Via XVII	Iron
1998.1580	Syringe/Probe	Archaeological site of Fujacal	Copper alloy

Most medical surgical tools have been found in tombs or houses of physicians. Regarding the material that has been excavated in Bracara Augusta, no physician's inscription or tomb has been discovered so far. The grooming tools from Via XVII's necropolis are related to medicine, but the funerary context is not a physician's tomb, and there are no primary medical-surgical tools. Neither has the Roman Domus excavation yielded any significant medical material so far. The instruments related to medicine and surgery have been recovered from Top of Cividade Hill's and excavations in the surrounding area, namely, a scalpel handle, bow shears, and a spoon-probe. The ear-probe has unusual decoration for this typology, but it demonstrates the characteristics of a surgical device. Tweezers and ligulae are grooming tools. The finding of surgical tools in this archaeological site may be explained by the fact that they originate from the baths building.

A close relationship between baths and health care is a well-established part of therapeutics. Massage and hydrotherapy are still helpful in physiotherapeutic treatments. In Roman times, the water temperature was also prescribed (on this subject, see Merten 1983, 101-113). The massagers (*unctores* or *alipta*) and *iatroalipta* (sports physicians; literally: a physician who cures by anointing) were members of the bathing staff (Merten 1983, 126-127). *Iatroalipta* were mentioned by Celsus:

Sanus homo, qui et bene valet et suae spontis est, nullis obligare se legibus debet, ae neque medico neque iatroalipta cfere.

A man in health, who is both vigorous and his own master, should be under no obligatory rules, and have no need, either for a medical attendant or for a rubber and anointer.

(Celsus, Book I Chapter I, translated by Hendersen 1938, 43).

Ernst Künzl has hypothesized that rooms associated with the Roman baths would have functioned as surgical rooms. Very little is known about the places where Graeco-Roman physicians carried out surgical operations. Their houses are possible candidates since many instruments have been found in excavations there. Not many surgical instruments have been found in baths excavations. However, baths, being quiet places with a water supply might have been suitable locations for conducting surgical operations. Surgical instruments discovered in a room at the baths of Colonia Ulpia Traiana, near Xanten, the capital of the Roman province Germania inferior (currently near Bonn, Germany) have also suggested baths as being likely locations. The excavated instruments were the following: two iron copper-alloy and iron scalpel handles with beautiful niello inlays; a circular iron handle decorated with three rings of a gold sheet with a small hole in which

a cautery was possibly inserted (since cauteries were made of iron); two bone copper-alloy and iron surgical chisels with beautiful decorations of gold and niello. They were very well preserved, the bone chisels matching the Roman *scalprum planum* (Künzl 1986, 491-509, fig. 2, 3). These tools indicate complex bone operations, challenging to perform at home. Diverse medical tools have been found at the Trier Baths, such as ear-probes, mixing palletes, oculist seals, probes and spatula-probes; these also suggest the existence of medical activity, medicine preparation and ophthalmic care at the baths (Künzl 1986, 491-509, fig. 4, 5).

Bone chisels and elevators have been discovered at the Roman legion camp of Vindonissa (currently in Switzerland), a proper place for surgical management of traumatic bone injuries in soldiers (Künzl 2002, 42). Teeth or bone forceps and pharmacy tools were found in these places (Tabanelli 1956, 60, Tav. XV, XVI, XVII, XVIII). During Emperor Hadrian's time (reigned 117-138), bath facilities were reserved to assist patients from the public administration (Merten 1983, 63). The earliest Roman surgical instruments were found in the late republican Legionaries' camp of Cáceres el Viejo in Spain (Künzl 2002, 29).

Conclusion

The archaeological excavations of Bracara Augusta have unearthed interesting medical-surgical, and grooming devices some of which, like the probe, are difficult to interpret, and provide evidence that medicine and surgery were practised in the city just as in the towns of the Roman world. Some identified tools are either rare or unique in Portugal and add valuable information to the evidence supporting Roman surgery as practised in the Iberian Peninsula (on this subject, see Barroso 2020 c, 41-64). Baths are also rare places where surgical instruments have been discovered, suggesting the possibility that these facilities were exploited as surgical rooms. Since a large part of the Bracara Augusta still remains to be excavated, hopefully, more tools and specific surgical contexts will come into the light in the future.

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