

JAHRBUCH
FÜR
ANTIKE UND CHRISTENTUM



JAHRGANG 67 · 2024

ASCENDORFF VERLAG
MÜNSTER WESTFALEN

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WAHNGENOMMEN.

SATZ: RHEMA – TIM DOHERTY, MÜNSTER

PRINTED IN GERMANY

GEDRUCKT AUF SÄUREFREIEM, ALTERUNGSBESTÄNDIGEN PAPIER 

ISSN 0075-2541
ISBN 978-3-402-10738-6
eISBN 978-3-402-10739-3 (EBook)

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ROMAN CRUCIFIXION

A medical and archaeological perspective and its implications for the execution of Jesus of Nazareth*

Crucifixion, a brutal form of capital punishment, reached its zenith in the 1st century AD. This article comprehensively explores the archaeological evidence, literary descriptions, and artistic depictions of Roman crucifixion during and just before and after this apogee. For the first time, an archaeologist and a podiatric surgeon jointly research the physical remains of five crucifixion victims in the Mediterranean Basin, three of which derive from Roman Judea, and three of which involve nails driven through the *calcaneus* bones of the victims. We explore a diversity of crucifixion methods and draw careful conclusions about what was normative. In addition to the five cases, we deal with the biblical and extrabiblical references to the crucifixion of Jesus of Nazareth as well as comparing the wounds of the crucified man seen on the ›Shroud of Turin‹ with the five known cases.

Keywords: crucifixion; podiatry; Shroud of Turin; historical Jesus; talisman

I. Introduction

Crucifixion is synonymous with extreme suffering and agony. The word »excruciating« comes from the Latin *ex cruce* meaning »from the cross«. The agony of such a death includes severe blood loss, suffocation, dehydration, prolonged exposure, shock, fatigue, rapid infection, and intense muscle spasms.

Crucifixion was a prevalent method of capital punishment for non-citizens in the Roman empire during the Julio-Claudian and Flavian dynasties, yet it remains unclear if a standardization of the process had developed or if each *quaternion* uniquely performed the act. The latter seems more likely although executioners almost certainly developed best practices. Despite ongoing archaeological, textual, and scientific explorations, numerous questions remain unanswered.

This article elucidates the medically known aspects of crucifixion through the lens of a podiatric physician and surgeon and an archaeologist. We explore the remains of several crucifixion victims along with relevant literary descriptions, artistic depictions, and other evidence to determine how and why Roman executioners drove nails through their victims' extremities. Archaeological findings of crucified remains offer tangible evidence of the crucifixion act, allowing for a better understanding of the suffering of Jesus of Nazareth and countless other victims. Scholars debate many of the specific details about Jesus's life and ministry, but the historicity of his crucifixion is not

* We appreciate Sarah Ferry's excellent assistance in researching, editing, and preparing the manuscript for publication and Emma Clodfelder's help in preparing the illustrations. Jacob Figueroa assisted with the Latin translations. Craig Evans, Roy

Kotansky, and Yoel Elitzur reviewed the manuscript, and Israel Hershkovitz and Zvi Greenhut consulted with us about their involvement in Cases 1 and 5 respectively. Any errors are solely our responsibility.

in question¹. While the New Testament and extrabiblical literature describe crucifixion, the archaeological record provides physical data. This archaeological and medical analysis demonstrates what myriad victims suffered under Imperial Rome.

II. Crucifixion

1. History

The brutal practice of nailing victims to a post or impaling them with a stake emerged among the Assyrians, Babylonians, and Persians in the 6th century BC². In the 4th century BC, Alexander the Great accelerated the use of crucifixion throughout the eastern Mediterranean world, after which the Phoenicians and ultimately the Romans embraced it in the 3rd century BC³. References in the plays of Plautus⁴ further indicate crucifixion was a common practice by the 3rd century BC. The Romans perfected crucifixion as a form of humiliating torture and continued to employ it until Constantine I abolished the practice in the 4th century AD⁵.

Normally, the Romans reserved this cruel form of execution for the lowest and most abhorrent individuals: slaves, criminals, dishonored soldiers, Christians, and non-citizens. Romans only crucified citizens charged with sedition, as was the case of Antigonus II Mattathias, the final Hasmonean ruler of Judea. In Case 1, the first of several which we discuss below, we deal with his probable skeletal remains. The death that resulted from crucifixion, which could span from a few hours to as long as four days, was the culmination of complex and multifactorial pathologies⁶. Typically, death resulted from asphyxiation, as the victim's chest muscles weakened, compounded by blood loss and dehydration.

One of the most dramatic mass executions in Roman history was the crucifixion of 6,000 gladiators and slaves along the *Via Appia* following the Spartacus revolt in 73–71 BC⁷. Josephus⁸ records several instances of mass crucifixions in Roman Judea, such as the 800 captives executed by the Hasmonean king Alexander Jannaeus, who ruled from 103–76 BC, and 2,000 Jews crucified by the Roman general Quintilius Varus in

¹ Ignatius (ca. 35–110 AD) (Smyrn. 1,2) writes that he was »truly nailed (καθηλωμένον) in the flesh for us under Pontius Pilate and Herod the tetrarch«. The accounts of the Jewish historian Josephus (ca. 37–100 AD) (ant. Iud. 18,3,3) and the Roman historian Tacitus (ca. 56–120 AD) (ann. 14,168) corroborate the gospel narratives and the patristic sources that Pilate condemned Jesus to death by crucifixion. The gospels provide concise details, which when taken together, offer an accurate, albeit incomplete, description of an ancient crucifixion.

² RETIEF / CILLIERS 2003, 938/41; COOK 2014, 312f.

³ The practice of crucifixion likely passed to the Romans during the Punic Wars, as suggested by Livy (22,13,9). He notes that the Carthaginians employed crucifixion, and shortly afterward the Romans adopted it, using it on rebellious slaves in

217 BC. The Romans may have learned the method from the Carthaginians due to their frequent interactions. See TZAFERIS 1985, 44/53.

⁴ e.g., Plaut. Epid. 513.

⁵ RETIEF / CILLIERS 2003, 938.

⁶ COOK 2014, 2.

⁷ Cf., e.g., Appian. b. civ. 1,120; RUTLEDGE 2015, 59. In the mid-1st century AD, Quintilian (decl. 274,13) states that »Criminals are crucified at the busiest roads to maximize visibility and instill fear in the most people«. This aligns with Joh. 19,20, which notes that the Romans crucified Jesus near the city, suggesting the crucifixion site sat adjacent to a well-traveled road, as indicated by the presence of passersby.

⁸ Joseph. b. Iud. 1,96/8; ant. Iud. 13,379f.

ca. 4 BC⁹. These episodes illustrate how crucifixion served as a public spectacle and deterrent, a practice continued by Roman military commanders and future emperors Vespasian and Titus during the First Jewish Revolt (66–70 AD), when approximately 500 Jews daily suffered this ultimate punishment¹⁰.

2. Procedure

Initially, the Persians fastened victims to trees or impaled them with poles, preventing their feet from desecrating sacred land¹¹. Over time, poles evolved to an upright beam, known as the *stipes* or *staticulum*, and a horizontal crossbar, the *patibulum*.

Roman crucifixion protocols typically required the condemned man to carry the *patibulum* to the execution site, to be connected to a *stipes*¹². According to JOSEPH ZIAS and ELIEZER SEKELES, wood scarcity led to reuse of the *patibulum* and the *stipes*¹³. While the Romans employed various cross designs, archaeological and historical data suggest they normally used the Tau (T-shaped) cross in the province of Syria, which encompassed Roman Judea during the 1st century AD, although they likely also used the Latin (t-shaped) cross and other designs¹⁴. JOHN ROBISON correctly posits that executioners stretched the arms of crucifixion victims horizontally on the *patibulum*¹⁵. Seneca¹⁶ describes crucifixion as an act in which the victim's »limbs [are] stretched out upon the cross«. This corresponds with Joh. 21,18, where Peter is told that he will die with his arms outstretched (ἐκτενεῖς τὰς χεῖρας). Additionally, one verse in the *Anthologia Latina*, dating to ca. the 2nd century BC, portrays a criminal as »outstretched on the infamous stake«¹⁷. These references collectively indicate that the typical method of crucifixion involved outstretched arms. This aspect of crucifixion appears to have been standardized.

However, crucifixion methods varied due to regional preferences and the executioners' proclivities. Classical accounts offer many discussions of crucifixion. Seneca notes: »I can see crosses over there, all different – different makers have different designs. Some hang the victim head down, others drive a spike through the victim's pelvis (*alii per obscena stipitem egerunt*), others stretch out a victim's arms on a forked transverse beam«¹⁸. Plutarch asks: »But will you nail him to a cross or impale him on a stake?«¹⁹ While these writings provide some details about the configuration of crosses, they provide limited data on how the *executor mortis* and his *quaternion* attached victims to the crosses. In fact, it seems that executioners sometimes only employed ropes;

⁹ Joseph. ant. Iud. 17,295; b. Iud. 2,75.

¹⁰ TZAFERIS 1985, 44/53.

¹¹ According to Josephus (ant. Iud. 11,267), the king of Persia in the Esther narrative (Esth. 7) »ordered that at once (Haman) be hung upon the very cross until he died (ἐξ ἐκείνου τοῦ σταυροῦ κρεμασθέντα ἀποθανεῖν)«. See SCHNEIDER 1971, 573; EDWARDS / GABEL / HOSMER 1986, 1458.

¹² KOHLER / HIRSCH 1906, 373f.; BARBET 1953, 46/51; EDWARDS / GABEL / HOSMER 1986, 1458.

¹³ ZIAS / SEKELES 1985, 22/7.

¹⁴ CHAPMAN / SCHNABEL 2015, 311; EVANS 2015, 129.

¹⁵ ROBISON 2002, 53.

¹⁶ Sen. ira 1,2,3.

¹⁷ THACKERAY 2010, 415.

¹⁸ Sen. ad Marc. 20,3. A forked transverse beam apparently refers to an X-shaped St. Andrew's cross; *alii per obscena stipitem egerunt* is better translated »others drove a stake (nail?) through the obscene (part of the body)«. Here, *obscena* serves as a euphemism for the groin area or genitals.

¹⁹ Plut. Moralia 499.

other times they only used nails; and sometimes they used both. Pliny the Elder (23–79 AD) refers to executioners using ropes²⁰, and Xenophon of Ephesus also indicates that Romans in Egypt used ropes in crucifixion: »They raised the cross and bound him to it, tying his hands and feet tight with ropes«²¹. The *Acts of Andrew* record that soldiers bound Andrew’s feet and armpits with ropes, without the use of any nails²², whereas Josephus confirms the use of nails, noting that soldiers »amused themselves by nailing their prisoners in different postures«²³.

Importantly, Cases 1/5 confirm the use of nails in crucifixion, but regrettably, archaeological evidence of crucifixion is generally limited, with only two known *calcaneus* bones (heel bones) found with an iron nail still embedded. Another *calcaneus* bone bears the marks of crucifixion, but without an extant nail. One victim’s hand still has nails in it. We discuss these cases below²⁴.

3. Archaeological evidence

The fact that archaeologists have recovered evidence of five men from the Early Roman period crucified with nails counters the claims of historians such as JOSEPH W. HEWITT and more recent scholars like MEREDITH J. C. WARREN who challenge the traditional narrative of Jesus being nailed to the cross²⁵. They argue that most crucifixion victims were likely tied to crosses rather than nailed, a view first advanced before most of the archaeological discoveries discussed here. Alternately, PAUL WINTER claims that though nails could have been used in the hands, they were not used in the feet²⁶.

Valid explanations exist for limited archaeological findings related to crucified individuals. For economic reasons, executioners reused crucifixion nails whenever possible²⁷. Given the macabre belief in the magical properties of crucifixion nails, soldiers at times likely sold them as talismans²⁸. According to ZIAS and SEKELES, crucifixion nails were usually tapered iron spikes ca. 6.3 in (16 cm) long with a square shaft ca. .4 in (1 cm) across²⁹; however, Cases 1/5 (below) suggest that this excessive length would be the exception rather than the standard. Another reason for the scant number of pierced skeletons is that the most efficient way to remove nails embedded in bone from crucified bodies was to break the bone, thus destroying evidence of the nail’s passage through the bone. Furthermore, nails driven through the *dorsum* of the feet or through various parts of the hand and wrist area would not have caused notable pathologies after the flesh decomposed.

²⁰ Plin. n. h. 28,4.

²¹ Xen. Eph. 4,2,1.

²² Act. Andr. 148. The *Acts of Andrew*, an Early Christian apocryphal text, recounts the missionary journeys, miracles, and martyrdom of the Apostle Andrew. Although the original text no longer exists, portions of it survive in various manuscripts and fragments, including the *Passion of Andrew*, which details his crucifixion. Act. Andr. 148 focuses on Andrew’s final moments on the cross.

²³ Joseph. b. Iud. 5,541.

²⁴ JEFFREY GARCIA (2025, 56) and other authors mention an »archaeologically attested« crucifixion in Egypt but fail to cite a source or sources to substantiate the claim.

²⁵ HEWITT 1932, 29/45; WARREN 2016.

²⁶ WINTER 1961, 95f.

²⁷ ROBISON 2002, 52.

²⁸ EVANS 2015, 140f.

²⁹ ZIAS / SEKELES 1985, 22/7.

The prevalence of nails in crucifixion appears more common than some scholars have previously suggested³⁰. ROBISON notes that the earliest recorded »nailings« occur before the 3rd century BC, with seven instances documented³¹. In the 3rd century BC, there are four recorded cases, followed by three in the 2nd century BC, and three in the 1st century BC. In the 1st century AD, however, there is a sharp increase, with twenty-one recorded instances of nailing. This number declines in subsequent centuries, with seven in the 2nd century AD, and only one each in the 3rd and 4th centuries AD. The fact that evidence for nailing victims to crosses reached its apogee in the 1st century AD supports the authenticity of the canonical gospel accounts of Jesus's execution.

Six of these cases occur in Greece, two in Carthage, and thirty-nine within the Roman Empire. Of those within the Roman Empire, eight occurred in Judea and two in Egypt³². There were thirty Roman provinces in the 1st century AD, so an equal distribution would have been ca. 1.3 per province. Judea, within the province of Syria, was the epicenter of crucifixion with nails. While this data does not provide a definitive answer regarding the crucifixion of Jesus with nails, it demonstrates verisimilitude in that historically, the use of nails was most prevalent in the time and place where Jesus lived.

Both Dtn. 21,22f. and the so-called Qumran Temple Scroll (11Q19 64,11/3) stipulate that those who are »hanged on a tree« must not remain there overnight; their bodies should be buried on the same day as their death³³. However, this was not the common Roman practice. The intent of crucifixion was to prolong the victim's humiliation for as long as possible. After death, the bodies often remained on the cross, where birds and wild animals consumed them (cf. pl. 3d), serving as a grim warning to others³⁴ and ensuring the absence of physical remains³⁵.

Although there are limited extant archaeological examples of crucified victims, the known examples illuminate how the Romans nailed Jesus of Nazareth and countless others to crosses. While the small number of identified crucifixion victims prevents us from drawing definitive conclusions about certain details of crucifixion, several patterns have emerged which we explain in the examples which follow.

³⁰ Josephus (b. Iud. 2,306/8; 5,449/51) records that during a time of material scarcity at the conclusion of the First Jewish Revolt in 70 AD, Roman soldiers were crucifying Jews at a staggering rate of 500 per day. Despite a shortage of supplies, nailing victims to crosses remained common.

³¹ ROBISON 2002, 49.

³² ROBISON 2002, 49.

³³ 11Q19 64,11/3 reverses the Dt. 21,22f. sequence of »death then hanging«, which reflects the practice of crucifixion in the Greco-Roman period when 11Q19 was composed.

³⁴ Suet. vit. Aug. 13,1f.

³⁵ Suetonius records that when a man, aware of his impending execution, pleaded with Augustus for the mercy of a proper burial – a request deeply significant in Roman society due to the belief in the necessity of burial rites for the soul's peace in the afterlife – Augustus coldly responded, »That will belong to the jurisdiction of the birds« (*iam istam volucrum fore potestatem*). This response implies that the man's body would be denied burial and left to be devoured by birds, a disgraceful form of posthumous humiliation. Such a practice reflected the Roman custom of leaving the bodies of the crucified exposed, where scavenging animals (pl. 3d) would consume them, symbolizing ultimate dishonor and the erasure of dignity even in death. See EVANS 2015, 165.

4. Crucifixion victims: five case studies

Case 1: body in Abba Cave

In 1970, construction of the Giv'at ha-Mivtar neighborhood in northeast Jerusalem yielded the buried remains of a pierced crucifixion victim³⁶. Workers accidentally uncovered a late Second Temple period tomb during the construction of a residential property, which necessitated a proper archaeological excavation. The tomb contained two chambers dating to the 1st century BC. Excavation of the tomb yielded an ornate ossuary, above which was an Aramaic inscription which reads as follows, according to YOEL ELITZUR³⁷:

I am Abba, son of Eleazar the priest, son [= descendent] of Aaron the great. I am Abba, the tormented, the pursued, born in Jerusalem and exiled to Babylon, who brought back Mattathiah son of Judah and interred him in the cave I acquired by the writ.

Early analysis by YEHOSHUA MEIR GRINTZ posited that this could be the tomb of Antigonus II Mattathias, the final ruler of the Hasmonean dynasty³⁸. Antigonus II Mattathias ruled with the help of the Parthians from 40 to 37 BC. When the Romans under Mark Antony and Herod defeated the Parthians, a slaughter of the previous regime ensued. Antigonus II Mattathias met his gruesome fate at this time, being crucified and decapitated on Mark Antony's orders³⁹.

The tomb contained compelling evidence: the detailed engraving on the wall by Abba; a luxuriously adorned ossuary; and the skeletal remains of a roughly 25-year-old, relatively tall man, including the hand bones with nails affixed to them and a severed jaw with cuts on the second *vertebra*, which according to NICHOLAS HAAS, arguably Israel's leading physical anthropologist at the time, suggested decapitation by a sword or similar sharp implement⁴⁰ – signs potentially matching those expected from the crucifixion and beheading of Antigonus II Mattathias (pl. 2a). Furthermore, the unmarked ossuary, covertly placed beneath the cave's floor, hints at a possible clandestine burial during the persecution of the Hasmoneans in the post-Antigonus II Mattathias period. ELITZUR postulates that during this time, Abba secretly carved the inscription and hewed his own burial cave⁴¹. These observations align with the recorded age of Antigonus II Mattathias and correspond with historical accounts from Josephus and Dio Cassius who documented the events surrounding Mark Antony's order to crucify, scourge, and behead the Jewish king who was a rival to Herod, son of Antipater⁴².

³⁶ Construction of the Giv'at ha-Mivtar neighborhood revealed several tombs, the two most notable of which contained the bones described in Cases 1 and 2. VASSILIOS TZAFERIS was the excavator and researcher of the Case 1 burial cave and its contents (id. 1974, 61/4), and JOSEPH NAVEH analyzed the inscription and its distinctive writing in 1973 and 1974. ELIEZER SAMSON ROSENTHAL examined the inscription's content and its cultural context in 1972, 1973, and 1974.

³⁷ Personal correspondence, December 30, 2024.

³⁸ See GRINTZ 1974, 20/3; id. 1975, 256/69.

³⁹ Joseph. ant. Iud. 15,8f.; Dio Cass. 22,6. Cf. STERN 1980, 360f.

⁴⁰ See YIGAL LOSIN, »Aharon ha-Maccabeem (Last of the Maccabees)«, broadcast on December 8, 1974.

⁴¹ ELITZUR 2013, 100.

⁴² Joseph. ant. Iud. 15,1; Dio Cass. 22,6. – Antigonus II Mattathias was born ca. 63 BC and was executed in 37 BC, making him ca. 26 years old at death. Josephus's history of these events relies upon Strabo whose original account *Historica Hypomnemata* (»Historical reminiscences«) is not extant. Josephus (ant. Iud. 15,8f.) cites Strabo as not-

Considerable debate ensued after the sudden accident that HAAS suffered, which paralyzed him for years until his death. Thus, the initial report on the bones found in the Abba Cave remained unpublished. PATRICIA SMITH of the Hebrew University re-evaluated the bones and disputed most of HAAS's claims⁴³. SMITH contended that the jawbone belonged to a short elderly female and the nails did not actually penetrate the bones of the hand, thus negating the idea that the bones belonged to a crucifixion victim⁴⁴.

Most scholars accepted SMITH's assertions until 2013 when ELITZUR identified Abba as the head of a family mentioned by Josephus as »the sons of Baba«. ELITZUR posits that Jewish texts interchangeably used »Baba« and »Abba« when describing a family of Hasmonian loyalists after Herod's rise to power⁴⁵. ELITZUR has confirmed the views of HAAS and GRINTZ that the »Abba« ossuary held the skeletal remains of the last Hasmonian prince. He also speculates that after HAAS's death⁴⁶, SMITH may have received a disorganized mix of bones including remains from other sites, leading to a possible mistake in identifying the person with the cut jaw as a female.

Using an electron microscope, anthropologist ISRAEL HERSHKOVITZ from Tel Aviv University reassessed the hand bones of the victim and the nails found affixed to them. He determined that the nails passed through the hand bones and into the *patibulum* before being intentionally bent to pin the hands⁴⁷. Excavation of the Abba Cave yielded three nails, one of which had the base of a proximal phalanx bone fused to it. This indicates the executioner drove the nail through the distal palm, at the junction between finger and distal palm. A second bent nail had a proximal phalanx fragment on one side and a medial phalanx on the opposite side. This nail likely pierced the distal palm, again impacting the region between the palm and finger. Examination of the third nail did not reveal a connection to any of the bones⁴⁸ (pl. 1ab illustrate the anatomy of a human hand and the placement of the nails mentioned above). In summary, HERSHKOVITZ's analysis indicates that two short nails penetrated the base of the phalanges (fingers) as opposed to the metacarpals (palm) or carpals (wrist) and were still attached to the bones (pl. 2a). Apparently, the executioner drove two nails through the distal palm and then bent them, presumably to secure the hand on the *patibulum*, as previously mentioned.

JAMES TABOR notes that the »nails are driven into the hand, then either angled or bent into a hook, not to hold up the body but to keep the hands and arms in place – thus »tacking« or pinning the hands to the wood behind«⁴⁹. HERSHKOVITZ contends that the nails in this case were driven into the backside of the victim's hands, then either angled or bent into a hook, pinning the hands to the *patibulum*⁵⁰. He also asserts

ing that this form of execution was an exceptionally vile method, intended to degrade its victim; crucifixion had never previously been used in regicide. See STERN 1980, 360f.

⁴³ SMITH 1977, 121/4.

⁴⁴ SMITH 1977, 121/4.

⁴⁵ ELITZUR 2013, 100.

⁴⁶ ELITZUR 2013, 92.

⁴⁷ HERSHKOVITZ's consultative work on the Abba Cave victim remains unpublished. We obtained the above references to HERSHKOVITZ's work from personal correspondence (May 17, 2024) and from JAMES TABOR's blog and from personal correspondence (April 28, 2024) with CRAIG EVANS, all experts on the Abba Cave.

⁴⁸ TABOR 2016; SMITH 1977, 123; DAVID 2014.

⁴⁹ TABOR 2016.

⁵⁰ Personal correspondence, May 17, 2024.

that the arms were likely then tied to immobilize them and support some of the body weight, thereby prolonging the victim's duration on the cross as stated by ROBISON⁵¹.

While controversy surrounds this case, the crucified victim of the Abba Cave highlights some interesting points regarding the nailing of the hand. If HERSHKOVITZ's hypothesis is correct and the nails found in the Abba Cave victim penetrated the proximal phalanges of the distal palm, it would controvert the notion that the Romans employed a meticulous and standardized crucifixion process. It is possible that the nails in this case were only incidentally associated with the bones to which they were attached, especially considering the degree of degradation of the bone fragments. However, if these nails were driven through the distal palm without any anatomical or structural intent, then the nails may have simply pinned the hand to the cross and nothing more as suggested by HERSHKOVITZ and TABOR⁵². STEPHEN BORDES et al. correctly observe that it is highly unlikely that a nail driven through the distal palm could suspend a man's body unless he was tied to the *patibulum* with ropes⁵³. While this is controversial, as noted above, the Romans employed many variations of crucifixion. In this scenario, the nail would not impact a major nerve to maximize pain, and the nails in the distal palm would be unable to suspend someone on a cross without the support of ropes or fetters.

The analyses of ELITZUR and HERSHKOVITZ suggest that the individual interred in the Abba Cave was indeed King Antigonus II Mattathias. HERSHKOVITZ argues that Antigonus II Mattathias was first beheaded and subsequently crucified, a sequence intended to maximize humiliation and disgrace. This scenario suggests that Roman soldiers, in their haste, likely deviated from the standard crucifixion practices, if in fact such standardization existed, given that the victim was already deceased.

Another possible scenario, based upon the cohesion of the phalanges with the nails is that the nails could have initially been driven into the mid or proximal palm between the metacarpal bones and with the victim's weight and writhing, the soft tissues tore, resulting in the nail splitting the flesh of the hand distally towards the fingers. Over time the ligaments and tendons of the hand might have ruptured from the victim's body weight, resulting in the nail ending up far more distal in the hand than when he was initially nailed to the *patibulum*. Anatomically, the metacarpal bones lack strong soft tissue structures that could prevent the nail from tearing through the tissues resulting in damage to the finger bones as the body's weight pulls down upon the nail. This is exactly what PIERRE BARBET's experiment demonstrated⁵⁴.

TABOR contends that the executioner drove the nails into the palm, yet HERSHKOVITZ posits that the nails entered from the back of the hand⁵⁵. According to HERSHKOVITZ, this was accomplished because the cross was an X-shaped (St. Andrew's) instead of T-shaped (*tau*) cross. It is unclear which view is correct or if either view is correct. However, there is little doubt that an executioner drove two nails into the hand/palm region of Antigonus II Mattathias.

⁵¹ ROBISON 2002, 37.

⁵² Personal correspondence, May 17, 2024.

⁵³ BORDES et al. 2020, 17.

⁵⁴ BARBET 1953, 12/8. 37/147. 159/75. 187/208.

⁵⁵ See JOHN FOTHERGILL, »Riddle of the crucifixion«, Newsmax TV, 2013, featuring interviews with HERSHKOVITZ; TABOR 2016.

Case 2: Yehohanan

In 1968, an ossuary found at Giv'at ha-Mivtar in northeast Jerusalem, less than 1 km from the Abba tomb, contained the remains of a crucified young man, as evidenced by his right *calcaneus* being pierced with a 4.5-inch (11 cm) nail⁵⁶. The tomb is a typical 1st-century AD rock-cut tomb carved into soft limestone bedrock. It features an entrance leading to burial chambers containing benches for the desiccation process and niches (*loculi* or *kokhim*) for placing ossuaries. The tomb, part of a larger necropolis, was used for multiple burials over generations. Found in a relatively undisturbed condition, it provided significant archaeological insights, including the first physical evidence of crucifixion with the discovery of the ossuary, bearing multiple inscriptions of the name »Yehohanan son of Hagakol«.

The analysis of Yehohanan's skeletal remains provided insight into at least one of the Roman crucifixion techniques. The executioner pinned his foot to the *stipes* by driving a nail through his outer *calcaneus* with the help of a ca. 0.8 inch (2 cm) thick square wooden plaque, acting as a type of washer. The nail initially penetrated the wood plaque, and then after exiting the *calcaneus* bone, passed into the *stipes* where it bent, likely hitting a wood knot. ZIAS and SEKELES hypothesize that the wood plaque prevented the crucified victim from manipulating his foot free from the cross (pl. 2b/d)⁵⁷. They report on traces of rust on the crucifixion nail, indicating that executioners employed a used nail to crucify Yehohanan, but the rust could also have formed after Yehohanan's execution⁵⁸.

Since Yehohanan's hand and wrist bones did not exhibit obvious puncture wounds, investigators conjecture that the executioners tied his arms, rather than nailing his hands⁵⁹. While this may be correct, VASSILIOS TZAFERIS initially suggested that a nail passed between the *radius* and *ulna*, citing possible osteological evidence of such penetration. ROBISON correctly argues, as noted above, that »nailing is most frequently mentioned during the time place where Jesus lived – in the first century AD and under Rome rule«, suggesting that Yehohanan was more likely nailed, perhaps through the forearm area⁶⁰, as originally asserted by HAAS, rather than being tied to the cross⁶¹. HAAS posits that the right *talus* indicates amputation of Yehohanan's feet before removal of his body from the *stipes*, but ZIAS and SEKELES correctly dispute this assertion⁶².

CRAIG EVANS hypothesizes that Yehohanan's crucifixion may have occurred under the authority of Pontius Pilate (ruled ca. 26–36 AD)⁶³. If so, Yehohanan would have received a proper burial:

It was during peacetime – indeed, during the administration of Pontius Pilate – that both Yehohanan and Jesus of Nazareth were crucified. That both were buried according to Jewish customs should hardly occasion surprise. Jewish priestly authorities were expected to defend the purity of Jerusalem (or at least to give the appearance of doing so), while Roman authorities acquiesced to Jewish customs and sensitivities, as Philo and Josephus relate.⁶⁴

⁵⁶ TZAFERIS 1970, 18/32.

⁵⁷ ZIAS / SEKELES 1985, 22/7; HAAS 1970, 38/59.

⁵⁸ ZIAS / SEKELES 1985, 23.

⁵⁹ ZIAS / SEKELES 1985, 22/7; ZIAS / CHARLES-WORTH 1992, 282.

⁶⁰ ROBISON 2002, 53.

⁶¹ HAAS 1970, 38/59.

⁶² HAAS 1970, 38/59; ZIAS / SEKELES 1985, 190f.

⁶³ EVANS 2016, 55.

⁶⁴ EVANS 2015, 145.

In summary of Case 2, the tapered nail was not driven through the bony front (*dorsum*) of the feet but from the outside (lateral) through the right *calcaneus*. A small olive wood plaque served as a sort of washer through which a ca. 4.3 inch (11 cm) nail passed before traversing the *calcaneus* bone and then entering the *stipes*, where it apparently hit a knot causing it to bend⁶⁵.

Clearly the soldiers who were assigned the grim task of affixing Yehohanan's body to the cross drove a nail through each *calcaneus* to affix his feet on either side of the *stipes*. This positioning would have the victim's body oriented forward, with the legs on either side of the *stipes*⁶⁶. It remains unclear how the executioners affixed Yehohanan's arms to the *patibulum*.

Case 3: body in Gavello

In 2007, during a preparatory dig for a methane gas line from Venice to Bologna in Italy's Po Valley near Gavello, located approximately 20 miles south of Venice, archaeologists discovered a lone grave within a Roman archaeological context. It contained the remains of a man ca. 30 years old, notable for a deliberate puncture of his right *calcaneus* (the corresponding left *calcaneus* bone was missing). Analysis of the *calcaneus* revealed a complete perforation below the *sustentaculum tali*, the part of the *calcaneus* that supports the *talus* bone of the subtalar joint (pl. 2e).

The hole extended the full width of the *calcaneus* bone, with a round entrance measuring ca. 0.35 inch (9 mm) on the medial side and an exit of ca. 0.26 inch (6.5 mm) on the lateral side (pl. 2e)⁶⁷. The path of the lesion started linearly before sloping slightly downward. EMANUELA GUALDI-RUSSO et al. noted an elliptical depressed fracture on the medial aspect of the *calcaneus*, but not on the lateral, which suggests that the injury occurred *peri-mortem* and the blow was inflicted from medial to lateral, creating the fracture at the point of entry (pl. 2f)⁶⁸. GUALDI-RUSSO et al. present various possibilities for the positioning of the man's feet during crucifixion: Notably, nailing was exclusively through the heels rather than the top of the foot, which contradicts many post-classical period artistic depictions of crucifixion, and it has been hypothesized that the depressed fracture noted on the medial aspect of the *calcaneus* happened during the crucifixion⁶⁹; however, this conclusion is uncertain. In our view, the fracture likely occurred when removing the deceased man from the cross, in the retrieval of the nail, which was a traumatic and destructive task. In summary, the nail placement in the *calcaneus* is like that of Case 2 with several exceptions. The nail entered the medial of the *calcaneus* as opposed to the lateral: In this scenario the feet would have been nailed individually to the front of the cross (soles of the feet facing each other) with the knees painfully rotated outwards in an open position (pl. 3b). In this case, the *tibia* survived with no evidence of *peri-mortem* breakage⁷⁰. Thus, there is no indication of *crurifragium* to hasten death as noted of Jesus in Joh. 19,31/3.

Unlike the square-shaped wound in Case 2, the wound in Case 3 is circular. The researchers note that square nails were more frequent in Roman times, yet nails with

⁶⁵ ZIAS / SEKELES 1985, 27.

⁶⁶ ZIAS / SEKELES 1985, 26f.

⁶⁷ GUALDI-RUSSO et al. 2019, 1786.

⁶⁸ GUALDI-RUSSO et al. 2019, 1786.

⁶⁹ GUALDI-RUSSO et al. 2019, 1786.

⁷⁰ GUALDI-RUSSO et al. 2019, 1787.

circular shafts existed, as reported in the literature⁷¹. Concerning the arms, GUALDI-RUSSO et al. suggest that they » were likely affixed to the cross with nails driven through the wrists, in alignment with historical accounts of the time«⁷². However, it is also plausible that ropes bound the arms to the *patibulum* and that if the executioners used nails, they placed them somewhere other than the wrist, as per Case 1.

DEBRA MARTIN and RYAN HARROD note that the » irregular burial context, lack of grave goods, short adult stature and possible evidence of torture suggest a condition of captivity or slavery for the Gavello individual«⁷³. The Gavello victim's interment site was separate from familial tombs, which GUALDI-RUSSO et al. interpret as a possible reflection of societal rejection⁷⁴.

Case 4: body in Fenstanton

In Fenstanton, Cambridgeshire, during the preparations for a new housing development in 2017, archaeologists DAVID INGHAM and CORINNE DUHIG discovered the skeleton of a 25–35-year-old man, buried with his arms folded⁷⁵. A nail driven horizontally through the man's right *calcaneus* bone (pl. 3a) suggests he was a crucifixion victim. Examination of the pierced *calcaneus* bone points to a failed prior attempt to drive a nail through it.

Twelve iron nails ca. 2.94 inch (7.5 cm) surrounded the skeleton⁷⁶. They formed a northwest/southeast perimeter as follows: one at the head, one at the foot, five arranged in a straight line along the north side of the body, four forming a curved pattern along the south side, and one between the ankles. It is conceivable that the nail between the ankles was displaced from the nails on the south side of the body. Traces of oak on four of the nails suggests they may have derived from a now disintegrated coffin or bier. Alternately, EVANS posits that the nails may have formed an apotropaic boundary to either protect the dead from the living or the living from the dead⁷⁷. It is plausible that one or more persons, perhaps family members, retrieved this victim's body, returned it to a community, and interred it with others in a cemetery. This is consistent with Jewish law (cf. Dtn. 21,22f.); however, there is no evidence that this victim was Jewish.

Due to the muddy conditions, the nail (ca. 2.24 inch ~5.7 cm) in the *calcaneus* escaped detection until the anthropological examination. According to INGHAM the nail tip (ca. 0.70 inch ~1.75 cm) was missing, as in Case 1⁷⁸. Thus, the total nail length was ca. 2.94 inch (7.5 cm). INGHAM and DUHIG reported that the nail exited below

⁷¹ GUALDI-RUSSO et al. 2019, 1789.

⁷² GUALDI-RUSSO et al. 2019, 1789.

⁷³ MARTIN / HARROD 2015, 116/45.

⁷⁴ GUALDI-RUSSO et al. 2019, 1789.

⁷⁵ Fenstanton sits along an ancient Roman route connecting Cambridge and Godmanchester.

⁷⁶ Personal communication with INGHAM, January 1, 2025.

⁷⁷ EVANS 2024, 382.

⁷⁸ Personal communication with INGHAM, January 1, 2025. The fact that the perimeter nails were the exact length of the nail in the *calcaneus* lends weight to EVANS's theory that they formed an apotropaic barrier. The nails may have in fact been crucifixion nails.

the *sustentaculum tali* protrusion (pl. 1d), which matches the exit wounds in the other cases⁷⁹. They also noted the following:

The entrance hole (lateral, nail head side) is almost circular, and at its anterior edge is a small indentation which barely penetrates the bone. The exit (medial, nail-point side) is also circular but smaller, fitting the size of the nail. The entrance is roughened and slightly crushed but, contrary to most penetrating wounds, is beveled outwards, while the exit shows little damage other than a little crumbling of the edge. It is assumed that the entrance is larger than the exit because the head of the nail was driven into the bone, and that the smaller indentation is a ›misfire‹.⁸⁰

Considering the Romans' desire to inflict maximum pain while prolonging suffering, it is plausible that an executioner deliberately repositioned the nail to direct it towards the tarsal tunnel of the foot traversing along the inside part of the foot under the medial *malleoli* (inside ankle bone). The foot's largest nerve, the tibial nerve (pl. 1c), lies within the tarsal tunnel. Any trauma to this nerve or its distal branches would produce an incessant searing, agonizing pain akin to injury of the carpal tunnel in the hand.

The orientation of the nail, going from lateral to medial, matches the nail placement in Case 2. Unlike Case 2, no evidence indicates the use of a wood washer between the head of the nail and the foot on the lateral side of the *calcaneus*. Lastly, it appears the nail used for the victim of Case 4 is only half the size of the nail used in Case 2. This suggests that the primary purpose of nailing victims, at least in some instances, was not only to help suspend the body – ropes often stabilized the body. Instead, the nails ›tacked‹ the extremities to minimize movement and maximize pain⁸¹.

In summary of Case 4, this is only the second known crucifixion victim with the nail left in his *calcaneus* (the other is Case 2). Again, finds like this are extremely rare because executioners normally removed and reused nails. Looting of tombs exacerbates the scarcity of remains. The discovery of these crucifixion remains provides well-preserved evidence, shedding more light on the specifics of crucifixion techniques. Apparently, there were instances where executioners repositioned nails during crucifixion, as suggested by marks indicating a correction for misplacement, perhaps due to the victim's flinch.

⁷⁹ Nail placement below the *sustentaculum tali* during crucifixion (with slight variation in Cases 2/4) offered anatomical advantages. The *sustentaculum tali* is a bony projection on the medial side of the *calcaneus* composed primarily of dense cortical bone, stronger than the softer, spongy cancellous bone found in other areas of the *calcaneus*, making it less prone to fragmentation. By driving the nail below this area, executioners could secure a more stable anchor point that would resist the strain of supporting the body's weight. See INGHAM / DUHIG 2022, 27.

⁸⁰ INGHAM / DUHIG 2022, 27.

⁸¹ As the victim hangs on the cross, gravity pulls his body downward. This extends the chest and prevents the diaphragm from effectively contracting. Without the ability to push up using his feet, the victim is unable to relieve chest pressure, making it difficult to exhale and leading to death by asphyxiation. The act of pushing up with the feet drives the nails deeper into the wounds; likewise, the act of pulling up with the arms stretches the shoulders and wrists, pulling on the nails and causing searing pain.

Case 5: the Caiaphas family tomb nails

In 1990, archaeologist ZVI GREENHUT uncovered what is likely the family tomb of Caiaphas, the high priest who played a pivotal role in the trial of Jesus of Nazareth (Mt. 26,3.57; Joh. 11,49f.; 18,13f.; Act. 4,6). Discovered in Jerusalem's North Talpiot neighborhood, the tomb contained sixteen ossuaries. Ossuary six was inscribed »Joseph son of Caiaphas«, making a strong case for the tomb's association with Caiaphas who was infamous for his complicity in the execution of Jesus of Nazareth.

Among the recovered artifacts were two iron nails which measured ca. 3.2 inch (8 cm) long – one located inside an ossuary and the other on the floor of a burial niche (Kokh 4)⁸². The *Israel Antiquities Authority* (IAA) misplaced the nails and never properly recorded or photographed them. In 2014, an investigative journalist claimed that he had identified these nails in the artifact collection at Tel Aviv University's anthropology lab. The IAA disputed this claim, asserting that the nails found at the university likely had a different provenance. GREENHUT remains doubtful regarding the provenance of the two nails in question. He also emphasizes that the tomb's association with the biblical Caiaphas cannot be definitively proven⁸³. While there is evidence suggesting that the two nails in question were those originally found in the Caiaphas family tomb, this view remains uncertain⁸⁴.

RACHEL HACHLILI provides tabulations of the items recovered from several late Second Temple period Jewish tombs⁸⁵. By our count she lists 138 iron nails and posits that most of these nails were intentionally placed in tombs or ossuaries as talismans. HACHLILI's count does not include tomb finds of the past two decades. According to EVANS, the true significance of these nails pertains to their apotropaic powers⁸⁶. Nails, along with other iron objects, were placed in tombs and ossuaries to ward off malevolent spirits⁸⁷. A supposed demonic fear of iron motivated people to wear iron necklaces or rings as protective amulets and to place iron in tombs to chase away evil spirits. The pseudepigraphal *Testament of Solomon* from the late 1st century AD reveals this obsession. The demon Orniat, for example, is afraid »to touch iron« (τοῦ σιδήρου προσφάσσει) ⁸⁸. In *Lover of Lies*, a mid-2nd century AD dialogue, Lucian notes that Eucrates explains that he has grown accustomed to seeing ghosts and demons and so is not afraid of them. However, he also possesses a protective »ring made of iron from crosses« (σιδήρου τοῦ ἐκ τῶν σταυρῶν) and has been »taught the spell of many names« (τὴν ἐπωδὴν ἐδίδαξεν τὴν πολυώνυμον) ⁸⁹.

While GREENHUT and the IAA propose that the two nails originally discovered in the Caiaphas family tomb were only used as implements for inscribing the names of the deceased on the ossuaries, ARYEH SHIMRON et al. and EVANS present compelling arguments that these nails were amulets. EVANS, having personally inspected the nails from the Caiaphas family tomb with HERSHKOVITZ, notes the following:

⁸² GREENHUT 1992, 68.

⁸³ Personal correspondence with GREENHUT, November 22, 2024.

⁸⁴ SHIMRON et al. 2020, 260/87.

⁸⁵ HACHLILI 2005, 402/34.

⁸⁶ EVANS 2015, 138f.

⁸⁷ EVANS 2015, 139.

⁸⁸ Test. Sal. 2,6. See also 1 Hen. 54,3/5, a passage from the *Similitudes* (i.e., *ibid.*, 37/71), which is extant only in Ethiopic. When Enoch sees iron chains, he is told, »These are being prepared for the hosts of Azazel, so that they may take them into the abyss of complete condemnation ... «.

⁸⁹ Lucian. *philops.* 17.

The presence of similar »rings« of calcium on other nails suggests that they were used in crucifixion and that after the passage of time they were recovered and put to new use. Accordingly, it is probable that both nails recovered from the Caiaphas ossuary or tomb had been used in crucifixion . . . these nails were used to crucify someone else and were later obtained and placed in the Caiaphas tomb because of their alleged protective powers.⁹⁰

A recent study by SHIMRON et al. investigated the link between the tomb and the two nails in question, particularly the possibility that these were crucifixion nails⁹¹. Employing petrochemical and geochemical analyses, including Scanning Electron Microscope (SEM-EDX), X-ray diffraction (XRD), and isotope analyses, the study compared the materials inside the ossuaries from the Caiaphas tomb with those that adhered to the nails. The researchers found that both the organic and inorganic materials from the ossuaries and the nails shared identical and unique chemical properties. This supports the conclusion that the two unprovenanced nails derived from the likely Caiaphas family tomb.

Furthermore, the presence of bone fragments on the nails (as visualized using electron microscopy) indicates their use in a crucifixion. SHIMRON et al. in no way connect these nails to the crucifixion of Jesus of Nazareth, but the study raises the possibility that the nails were placed in the ossuaries for their apotropaic properties, as people in classical times believed crucifixion nails were powerful amulets, as noted above⁹².

While SHIMRON et al. and EVANS present compelling evidence that the nails discovered in the Caiaphas tomb were used in a crucifixion and subsequently placed in at least one of the ossuaries for their apotropaic power, this interpretation remains speculative. The potential connection to Caiaphas adds an intriguing historical layer, potentially linking the tomb of the high priest involved in Jesus's trials and condemnation to artifacts associated with crucifixion, creating a narrative that historically and culturally resonates.

III. The accounts of Jesus's crucifixion

1. Extra-biblical references to the crucifixion of Jesus

New Testament texts, Early Christian writings, and Jewish and Roman authors from the late Second Temple period up to the Nicene Council in 325 AD and later consistently document Jesus's crucifixion. In the 1st century AD, Josephus documents that Jewish leaders delivered Jesus to Pilate for crucifixion⁹³. In the early 2nd century AD, the Roman historian Tacitus corroborates this, noting, »Christ was executed as a criminal by Pontius Pilate, during the reign of Tiberius« (*auctor nominis eius Christus Tiberio imperitante per procuratorem Pontium Pilatum supplicio adfectus erat*)⁹⁴. Similarly, in the 2nd century AD, Lucian mockingly mentions Jesus in his critique of Peregrinus and

⁹⁰ EVANS 2015, 143.

⁹¹ SHIMRON et al. 2020, 260/87.

⁹² SHIMRON et al. 2020, 285.

⁹³ Joseph. ant. Iud. 18,63f.

⁹⁴ Tac. ann. 15,44.

the Christians, calling him »the man who was crucified in Palestine«⁹⁵. Mara Bar-Serapion, a Syrian philosopher, references the crucifixion of Jesus, whom he describes as a »wise Jewish king«, in a letter likely written to his son toward the end of the 1st century⁹⁶. Justin Martyr (ca. 100–165 AD), a 2nd century AD Christian apologist, repeatedly refers to Pilate to identify Jesus: »Jesus Christ who was crucified under Pontius Pilate«⁹⁷. Additional early references to Jesus’s crucifixion under Pilate appear in the writings of Irenaeus⁹⁸, the Apostles’ Creed, and Tertullian⁹⁹ in the 2nd and 3rd centuries. Subsequent Christian writers from the 3rd to 5th century perpetually refer to Jesus’s crucifixion and its importance for Christianity¹⁰⁰, whereas the Babylonian Talmud’s contemporaneously composed tractate Sanhedrin (43a) refers to Jesus’s death by hanging – not crucifixion – in the following manner:

Jesus was hanged on Passover Eve. Forty days previously the herald had cried, »He is being led out for stoning, because he has practiced sorcery and led Israel astray and enticed them into apostasy. Whosoever has anything to say in his defense, let him come and declare it.« As nothing was brought forward in his defense, he was hanged on Passover Eve.¹⁰¹

Amongst others, Socrates Scholasticus (ca. 380–439 AD) reports that Helena, emperor Constantine’s mother, commissioned the building of a church in Jerusalem where Christ’s crucifixion occurred, on the same site where Hadrian had erected a pagan temple to Venus ca. 132 AD. Helena’s functionaries destroyed the pagan temple situated at the site, ordering Venus’s statue cast down and »having caused the statue to be thrown down, the earth to be removed, and the ground entirely cleared, found three crosses in the sepulchre«¹⁰². Allegedly, excavators found these three crosses with the nails that had been used to affix Christ to the cross, and the *Titulus crucis* – the inscription that read »Jesus the Nazarene King of the Jews«¹⁰³.

Crucifixion served not only as a method of execution but also as a means of public humiliation, often involving the nudity of the crucified man. Seneca notes that some crucifixions involved driving a nail through the pelvis (genitalia?)¹⁰⁴, which suggests that the victims were naked. Whether Jesus was crucified naked is uncertain but likely; some literary references suggest he was. For example, Melito of Sardis, a 2nd-century bishop, wrote the following:

O unprecedented murder! Unprecedented crime!
The Sovereign has been made unrecognisable by his naked body,
and is not even allowed a garment to keep him from view.
That is why the luminaries turned away,
and the day was darkened,

⁹⁵ Lucian. *mort. Peregr.* 11; cf. *ibid.*, 13: »that crucified sophist«.

⁹⁶ C. A. EVANS, *Jesus in non-Christian sources*: Chilton / Evans 1998, 455/7.

⁹⁷ Justin. *apol.* 1,55; cf. *ibid.*, 1,13,3. 61,13; 2,6,6; dial. 30,3; 76.6.

⁹⁸ Iren. *haer.* 2,32,4; 3,4,2. 12,9; 4,23,2; 5,12,5; *dem. praed. apost.* 74. 77.

⁹⁹ Tert. *apol.* 21,18; *adv. Iud.* 13,22.

¹⁰⁰ Eus. *dem. ev.* 10,8; Athan. *incarn.* 9f.; Joh. Chrys. *hom. div.* 27; Aug. *serm.* 3,16.

¹⁰¹ Cf. SCHÄFER 2007.

¹⁰² Socr. *h. e.* 17. The legend of the »invention« of the Cross is first attested by Ambrose of Milan in his obituary on Theodosius I in 395 AD (*Ambr. obit. Theod.* 40/9 [CSEL 73, 392/7]) and later adapted, e.g. by Paulinus and Rufinus.

¹⁰³ YOUNG 2006, 3; cf. ZENOS 1890, 54. The synoptic gospels mention the *Titulus crucis* but not with these exact words (Mt. 27,37; Mc. 15,26; Lc. 23,37).

¹⁰⁴ Sen. *ad Marc.* 20,3.

so that he might hide the one stripped bare upon the tree,
darkening not the body of the Lord
but the eyes of men.¹⁰⁵

The gospels do not mention Jesus wearing clothing while on the cross, only noting that the soldiers took his garments beforehand. There is no historical evidence supporting the use of loincloths during crucifixions, though later Christian art always portrays Jesus's groin area covered by a cloth. To the contrary, both Christian and non-Christian sources indicate victims were unclothed. DAVID TOMBS notes that the implication of nakedness is most overt in Joh. 19,23f., which says that after dividing Jesus's clothes the soldiers then threw lots for his tunic (inner garment) (χιτῶνα, *chitōna*) so as not to tear it¹⁰⁶. Moreover, TOMBS correctly notes that »nudity was an intentional, even strategic, part of punishment and carried a strong and readily recognizable public message«¹⁰⁷.

2. Biblical accounts

Pierced hands and feet

While the gospels do not explicitly state that soldiers nailed Jesus's hands and feet, the post-resurrection accounts in Luke and John certainly imply that they did: Jesus encourages his disciples to look at his hands and feet as confirmation of his identity (Lc. 24,39; Joh. 20,20.27), which suggests that his hands and feet bore distinctive marks. And when the Emmaus believers arrived in Jerusalem, Jesus said to those present: »See my hands and my feet, that it is I myself. Touch me, and see. For a spirit does not have flesh and bones as you see that I have« (Lc. 24,39 ESV).

The Early Christian movement believed that Ps. 22 was fulfilled in Jesus's Passion, often quoting or alluding to it¹⁰⁸. In fact, the New Testament itself does not quote the much-debated v. 17(16), but the early Church fathers do, e.g.: »The expression ›They pierced my hands and my feet (ὠρυξάν μου χεῖρας καὶ πόδα)‹ was used in reference to the nails of the cross which were fixed in His hands and feet (ἐξήγησις τῶν ἐν τῷ σταυρῷ παγέντων ἐν ταῖς χερσὶ καὶ τοῖς ποσίν αὐτοῦ ἡλῶν ἦν)«¹⁰⁹. Both the Hebrew and Greek of Ps. 22,17(16) are uncertain¹¹⁰; but even so, the fourth Gospel may allude to the verse in reference to Jesus's nail-pierced hands:

After Jesus's resurrection, he said to Thomas: ›Reach here with your finger, and see my hands; and reach here your hand and put it into my side; and do not be unbelieving, but believing‹. Thomas answered and said to Him: ›My Lord and my God!‹.¹¹¹

¹⁰⁵ Melito pasch. 97. Translation by STUART GEORGE HALL.

¹⁰⁶ TOMBS 2023, 19f.

¹⁰⁷ TOMBS 2023, 19f.

¹⁰⁸ e.g., HAYS 2016, 83/5. 161f.

¹⁰⁹ Iustin. apol. 1,35,5.7. 38,4. Justin Martyr cites the text several times in his *Dialogue with Trypho*.

¹¹⁰ The MT reads כְּאֵרֶב, »like a lion«. The Greek reads ὠρυξάν, »they dug« or »gouged«. 5/6 Hev-Sev4Ps frg. 11 may read כְּאֵרֶב, »they dug«. See FLINT 1997, 83. 88. Given the ambiguities of the Hebrew text, including the complexities of its parallelism, the question of the original reading must be left open. See the recent discussion in J. R. LINVILLE, Psalm 22:17b. A new guess: JBL 124 (2005) 733/44.

¹¹¹ Joh. 20,27f.

Passover typology – unbroken bones

The New Testament alludes to prophecies in the Hebrew Bible regarding the Passover lamb. Num. 9,12 states: »They shall leave none of it (sc. the Passover lamb) until morning, nor break one of its bones. According to all the ordinances of the Passover they shall keep it«. John the Baptist identifies Jesus as »the Lamb of God, who takes away the sin of the world« (Joh. 1,29). In 1 Cor. 5,7b, Paul makes this same connection: »For Christ, our Passover lamb, has been sacrificed«. Joh. 19,31/3 documents the fulfillment of Num. 9,12, Ex. 12,46, and Ps. 34,20:

Therefore, because it was the Preparation Day, that the bodies should not remain on the cross on the Sabbath (for that Sabbath was a high day), the Jews asked Pilate that their legs might be broken, and that they might be taken away. Then the soldiers came and broke the legs of the first and of the other who was crucified with Him. But when they came to Jesus and saw that He was already dead, they did not break His legs.

Our analysis demonstrates that some pierced crucifixion victims endured their executions without having any of their bones broken, which is consistent with the Passover typology and the fact that Jesus, according to biblical accounts, endured crucifixion without a broken bone.

3. Early artistic depictions of crucifixion

Some scholars argue that the early church avoided depicting Jesus on the cross until the 4th or 5th century¹¹². LARRY HURTADO challenges this view, noting an Early Christian crucifixion symbol known as the staurogram, which shifts the date of crucifixion depiction back by 150–200 years¹¹³.

The Greek letters *tau* (T) and *rho* (P) form the staurogram (Ϡ), which resembles a crucified figure. In Greek, »crucify« is expressed by the verb σταυρόω (*staurōō*) and »cross« by the noun σταυρός (*stauros*). By combining the *tau* and *rho*, Early Christian scribes created a pictographic symbol representing a crucifixion scene¹¹⁴. This symbol predates the more conventional depictions of the crucifixion that later emerged, indicating that symbolic representations of Jesus's crucifixion were already present in Christian iconography in the 2nd to 3rd centuries. The use of the staurogram in manuscripts for the words »cross« and »crucify«, perhaps as early as 175 AD, but certainly by the 4th century, supports the idea that Christians understood Jesus's »cross« to have had a specific form¹¹⁵.

The Pereire gem (pl. 3c), a tiny bloodstone intaglio, according to ROY KOTANSKY, depicts »the earliest representation of the crucified Jesus, in any medium«¹¹⁶. The figure shows Jesus's wrists tied to the *patibulum* and his feet positioned on either side of the *stipes*. The Pereire gem displays Jesus's feet straddling the T-shaped cross in a way consistent with nails entering the lateral *calcaneus* and being driven horizontally into the cross as in Case 2. Like the description by Melito, the Pereire gem depicts Jesus

¹¹² HARLEY-McGOWAN 2019, 106; ead. 2022, 69; DINKLER 1965, 133.

¹¹³ HURTADO 2013, 49/52.

¹¹⁴ HURTADO 2013, 49/52.

¹¹⁵ HURTADO 2006, 135/54.

¹¹⁶ KOTANSKY 2017, 632.

as completely unclothed. JOHN COOK dates this gem, perhaps an amulet, to a time »when the Romans were still practicing crucifixion«¹¹⁷. Thus, its *terminus ante quem* is the mid-4th century AD, and its *terminus post quem* is the late 2nd century AD¹¹⁸. FELICITY HARLEY and JEFFREY SPIER argue that »the style of carving, material, and inscription are all characteristic of the extensive corpus of Greco-Roman magical amulets produced in Egypt and Syria during the second and third centuries«¹¹⁹.



fig. 1. So-called Alexamenos graffito, ca. 200 AD.

Another very early depiction of Jesus's crucifixion is the Alexamenos or Palatine graffito, likely dating to the late 2nd century (fig. 1). It depicts a man with a donkey's head fastened to a T-shaped cross. Intended to be a mockery of Christians, the crucified figure pictured in the graffito hangs on the cross in the same way as the Pereire gem depiction, with feet straddling the *stipes*¹²⁰. The victim's posture closely resembles Case 2. To the left of the crucified figure, there is another man raising one hand in a gesture of veneration. The graffito commentary records that »Alexamenos worships

¹¹⁷ COOK 2014, 495.

¹¹⁸ KOTANSKY 2017, 632.

¹¹⁹ HARLEY / SPIER 2007, 228.

¹²⁰ COOK 2012, 92/8.

his god, Jesus Christus»¹²¹. According to EVANS, »literary references to outstretched arms or hands, sometimes nailed, cohere with the visual depictions, especially as seen in the Palatine Graffito«¹²².

The Puteoli graffito, from the Trajan-Hadrian era of the Roman Empire (98–138 AD), represents another very early depiction of a Roman crucifixion. Discovered in 1959 on the wall of a tavern in Puteoli near Naples, this graffito portrays a crucified individual seen from the rear. It depicts a figure with arms outstretched, nailed to a cross, and feet straddling the *stipes*. The presence of horizontal stripes on the body implies that the figure was likely whipped while unclothed before being crucified in a fully naked state (fig. 2)¹²³.

Finally, the image of Jesus's crucifixion on the wooden doors of the Basilica of Saint Sabina in Rome is the earliest known unambiguous portrayal of the passion in a

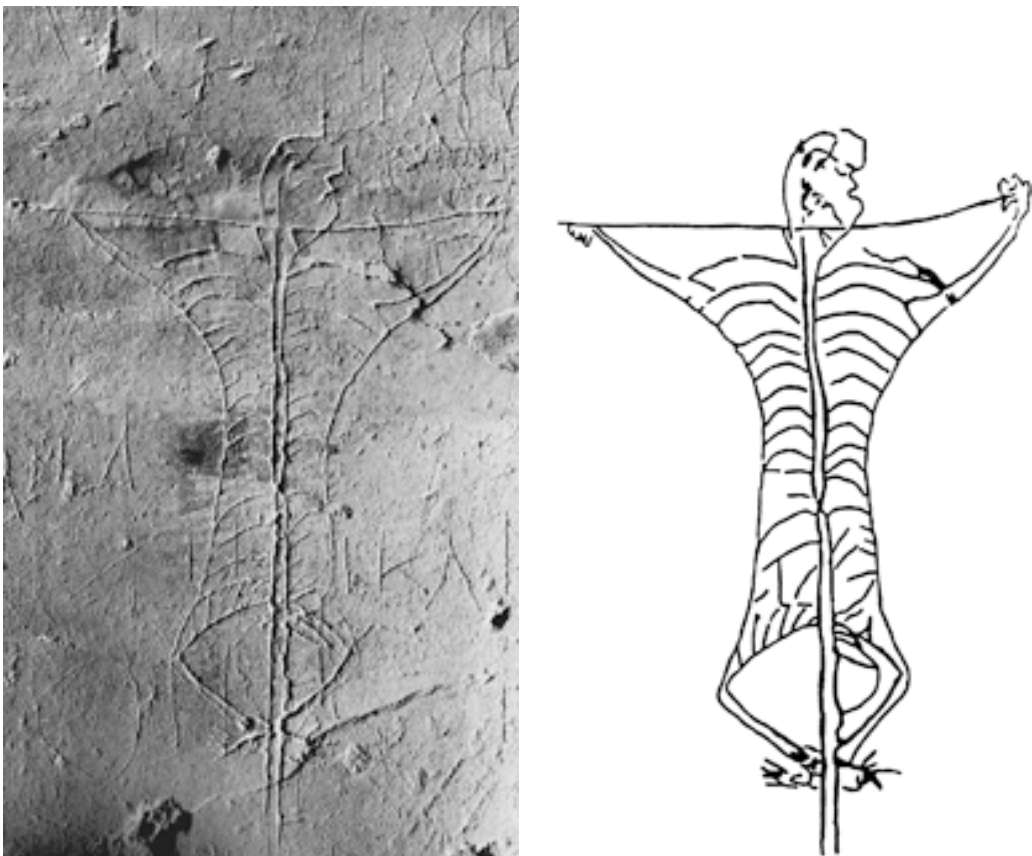


fig. 2. The so-called Puteoli graffito showing a crucifixion victim positioned on the cross in a straddling posture, with each heel secured by a nail on either side of the *stipes*.

¹²¹ AMIRAV / SMIT 2022, 215. Jesus's name is indicated as an acrostic by the Greek initials Ἰ(ησοῦς) Χ(ριστός).

¹²² EVANS 2011, 129.

¹²³ TOMBS 2023, 78.

Christian context. The image of Jesus with crucified thieves on his right and left dates to ca. 430 AD¹²⁴.

Medieval and Renaissance depictions of crucifixion increasingly diverge from the historical reality of the event, particularly in the representation of nailing Jesus to the cross. Paintings and artistic renderings from this period commonly depict nails passing through the *dorsum* of Jesus's often overlapped feet, with a single nail piercing both feet¹²⁵. However, to date there are no parallels in the archaeological record to support this representation. As previously discussed, the Romans did not follow a uniform method of crucifixion. Nevertheless, one consistent feature observed across various regions of the Roman Empire – whether in Jerusalem, Italy, or England – is the presence of nails piercing the *calcaneus* bones.

However, post-Nicene paintings and statues depicting a *sedile*, or small seat, and foot support or a *suppedaneum* may be accurate. Presumably, the purpose of these wooden projections was to prolong the victim's agony, allowing him to stay alive for two or three days, or longer. Use of a *sedile* or *suppedaneum* would have supported the body, thus reducing the weight upon the nails and allowing the victim to breathe more easily. However, no archaeological evidence supports this idea. A *suppedaneum* would not have been necessary nor likely when the *calcaneus* bones were nailed to the cross in the manner demonstrated by Cases 2/4. Nonetheless, several 2nd-century writers describe Jesus's cross as having a *sedile*¹²⁶, but despite its literary support, its reality seems unlikely. The same is true for a *suppedaneum*. According to JOHN WILKINSON artistic representations showing Christ on a cross with a *suppedaneum* represent a later artistic innovation, absent in ancient descriptions of the crucifixion device¹²⁷.

IV. The Shroud of Turin

Setting aside its alleged connection to Jesus of Nazareth, the so-called Shroud of Turin clearly depicts the physical trauma endured by a crucifixion victim¹²⁸. Much of what scholars know about Roman crucifixion somewhat aligns with several key features seen on the Shroud. As a forensic representation of crucifixion, it reflects remarkable attention to how the wounds on the Shroud represent historical reality.

¹²⁴ Cf. G. JEREMIAS, *Die Holztür der Basilika S. Sabina in Rom* (Tübingen 1980).

¹²⁵ In 1953, BARBET indicated that the nail would have to be at least 4.5 inch (11.4cm) long, but we think he underestimated the required length.

¹²⁶ Justin Martyr (dial. 91) likened the *sedile* on Jesus's cross to a horn sticking out. Irenaeus (haer. 2, 24,4) described the cross of Jesus as having five ends, specifying not just its height and length but also the seat, which he said supported the weight of the nailed individual. Around 200 AD, Tertullian (nat. 1,12; adv. Marc. 3,18) describes the cross as having a protruding *sedile*.

¹²⁷ WILKINSON 1972, 104/7. Some like RICHARD VILADESAU have interpreted the Alexamenos graffito (ca. 200 AD) as including such a footrest (see VILADESAU 2006, 21 fig. 14).

¹²⁸ The Shroud of Turin is a linen cloth that many researchers believe was the burial shroud of Jesus of Nazareth. Its first documented display was in the 1350s in France; it passed through various hands and endured damage from fires before being acquired by the Vatican in 1983. Currently housed in St. John the Baptist Cathedral under the care of the archbishop of Turin, the Shroud bears a full-length, frontal and dorsal negative imprint of a man's body. The Shroud has undergone extensive scientific scrutiny.

For many decades, analysis of the Shroud of Turin has centered on the blood patterns corresponding to various body parts of the crucified victim. The blood markings on the head, hands, feet, back, and sides align with locations referenced in the Gospels as places executioners inflicted wounds on Jesus (Joh. 19,1.34; 20,25). Several forensic and medical experts have examined these blood stains, interpreting them in light of known crucifixion practices¹²⁹. While scholars have debated the blood patterns on the Shroud, there is broad agreement that the blood stains indicate that nails pierced the hands or wrists¹³⁰.

Some who have studied the Shroud posit that the victim's feet were nailed dorsally, with one foot placed over the other¹³¹. The number of nails used in this technique remains unclear. ROBERT BUCKLIN, WILLIAM EDWARDS together with WESLEY J. GABEL and FLOYD E. HOSMER as well as BARBET argue for one nail¹³². VICTOR CAJA and MARIZIA BOI highlight evidence that casts doubt on the single-nail theory¹³³. JOSEPH GAMBESCIA claims the Shroud depicts two nail wounds in the right foot and one in the left foot¹³⁴.

However, none of these interpretations fully aligns with archaeological evidence from Cases 2/4 where nails were driven laterally or medially through the *calcaneus* bone and into the *stipes*. These differences between the Shroud's portrayal and archaeological finds highlight the need for further investigation. Upon examination of the highest quality images of the bloodstains on the Shroud that represent the pierced feet of the victim, several noteworthy features emerge.

1. Frontal view: The right foot shows a clear bloodstain from a wound in the mid-foot, while the left foot shows no visible nail entry or bloodstain. Both feet appear parallel with no overlap. The frontal view of the feet further seems to demonstrate a bloodstain originating from the right foot near the Lisfranc's joint where the tarsal and metatarsal bones join as opposed to the ankle. Minimal if any blood staining originates from the left foot. The blood stain on the right foot covers less than half of the visible foot imprint.

2. Posterior view: The right foot is more clearly imprinted, showing significant plantarflexion, and appears overlapped by the left foot, but the frontal view does not reflect this overlap.

3. Bloodstain patterns: The right foot imprint is clearer with blood emanating from what appears to be the dorsal right foot. Due to limited blood markings, the imprint of the left foot on the Shroud of Turin is faint and difficult to discern.

¹²⁹ BUCKLIN 1970, 14/26; EDWARDS / GABEL / HOSMER 1986, 1455/63; BARBET 1953, 12/8. 37/147. 159/75. 187/208; ZUGIBE 1988, 77; JOSEPH M. GAMBESCIA (MALONEY, P. C., »Joseph M. Gambescia, M.D., and the position of the feet on the Shroud of Turin. The history of an investigation«, paper presented at the conference *Shroud of Turin. The controversial intersection of faith and science*, October 9–12, 2014, Drury Plaza Hotel, St. Louis, Missouri [unpublished]); CAJA / BOI 2018, 1377/90; BORRINI / GARLASCHELLI 2019, 137/43.

¹³⁰ ZUGIBE 1995; EDWARDS / GABEL / HOSMER 1986, 1459; BORDES et al. 2020, 17; BUCKLIN 1958, 5/13. In the discussion (see below), we document the scholarly consensus that the wrist area is optimal for supporting the weight of a man on a cross.

¹³¹ BARBET 1953, 12/8. 37/147. 159/75. 187/208; BUCKLIN 1970, 14/26; EDWARDS / GABEL / HOSMER 1986, 1455/63.

¹³² BUCKLIN 1970, 14/26; EDWARDS / GABEL / HOSMER 1986, 1455/63; BARBET 1953, 12/8. 37/147. 159/75. 187/208.

¹³³ CAJA / BOI 2018, 1377/90.

¹³⁴ MALONEY 2014.

4. Nail placement: Discrepancies in foot positioning (overlap?) between the frontal and posterior views raise doubts about a single nail being used. The two-nail theory involves one nail through the dorsal right foot (potentially creating the extreme plantarflexed position of the right foot on the posterior view) with a second nail through the dorsal left foot overlapping the right. It is impossible to rule out two nails based on the blood stains. While in Cases 2/4 the executioners nailed the victims through the *calcaneus*, the crucifixion victim wrapped in the Shroud of Turin may have been nailed through the *dorsum* of his feet, perhaps in an overlapped position, or through the *calcanei*.

5. Blood flow volume: The amount of blood from one or more nails being driven through the feet along with the removing of the nail(s) would be extensive, enough to cover both feet to the toes. However, the amount of blood in the feet region of the Shroud is not extensive, especially on the left foot; if someone washed the body post-crucifixion, this could explain the limited volume of blood. Several fires damaged the Shroud, most notably in 1532. The water used to douse the fires may have distorted the blood stains around the feet and other areas.

V. Discussion

1. Hand or wrist?

As mentioned, post-Nicene artistic depictions of the crucifixion commonly show piercing through the hands, specifically between the metacarpal »palm bones« or the long bones that form the intermediate part of the hand between the phalanges and the carpal bones, which articulate with the forearm. The metacarpal bones correspond to the metatarsal bones in the foot (pl. 1b, 2b).

BORDES et al. correctly assert that the hand's anatomical structure between the metacarpal bones lacks ligaments, thus making it an improbable place for executioners to drive nails unless they used ropes to mitigate body weight¹³⁵. BARBET's controversial cadaveric experiments in 1953 involved suspending a weight from an arm severed at the forearm, with a nail inserted between the metacarpal bones¹³⁶. The nail failed to hold when the limb was agitated¹³⁷. Although BARBET did not explore nail placement within the wrist, he concluded that the wrist was the most likely piercing point. He chose a location towards the ulnar side near the wrist's crease, targeting a space amid the wrist bones known as Destot's space (pl. 4a). BARBET's experiments suggested that a nail driven through this area could better bear the weight of a man during crucifixion, but he then incorrectly asserted that a nail at this location would damage the median nerve controlling the thumb muscles¹³⁸.

¹³⁵ BORDES et al. 2020, 17.

¹³⁶ French doctor and World War I surgeon PIERRE BARBET (1884–1961) advanced the hypothesis that Jesus was nailed through his wrists rather than his hands. BARBET based this theory on cadaver exper-

iments he conducted as part of his Shroud of Turin research.

¹³⁷ BARBET 1953, 12/8. 37/147. 159/75. 187/208.

¹³⁸ BARBET 1953, 12/8. 37/147. 159/75. 187/208.

FREDERICK ZUGIBE refuted BARBET's hypothesis and proposed that the nail would have entered the ›Z Area‹, a space on the lateral side of the wrist, bounded by the second metacarpal, trapezoid, and capitate bones¹³⁹. This would injure the median nerve deep to the *flexor retinaculum* in the carpal tunnel, causing severe pain in the bony space between the index and middle finger support bones and the smaller carpal bones just beneath those, and without breaking any bones. This location too would cause injury to the median nerve thus maximizing the victim's agony.

BORDES et al. also conducted cadaveric studies to determine the probable site for nail insertion during crucifixion¹⁴⁰. Like ZUGIBE, they proposed that the optimal location for the nails was through the wrist's carpal bones. This may comport with the wound at the *nexus* between the arm and hand of the Shroud of Turin victim but is dissimilar from the nail placement in Case 1.

EDWARDS, GABEL, and HOSMER offer a slightly different approach concerning the placement of the nails:

(They) probably were driven between the radius and the carpals or between the two rows of carpal bones, either proximal to or through the strong bandlike flexor retinaculum and the various intercarpal ligaments. Although a nail in either location in the wrist might pass between the bony elements and thereby produce no fractures, the likelihood of painful periosteal injury would seem great.¹⁴¹

The final suggested site for the placement of the nail during crucifixion is between the *radius* and *ulna* bones of the forearm. This theory, advanced by BUCKLIN and STEPHEN LEWIS, posits that the interosseous membrane, the ligaments connecting the *radius* to the *ulna*, and the sheaths that enclose the tendons of both the flexor and extensor muscles would prevent nail movement¹⁴². As the nail would be driven roughly through the central point between the *ulna* and *radius*, it would cause tension in the long flexor muscles of the forearm, causing the fingers to curl inward. Moreover, there is a possibility that the nail could either compress or cut through the median nerve, causing intense pain in the palm and the outside three fingers potentially leading to a loss of function or strain in the tendons of the muscles that flex the digits or the thumb. The ulnar nerve, located more medially, would likely remain unaffected.

Only one of the extant crucifixion victims (Case 1) has surviving evidence of nails in one of his hands. The placement of the nails in Case 1 does not comport with any of the prevailing theories cited above.

The goal of the *exactor mortis* was to maximize pain and not inflict wounds that would facilitate a quick death. BORDES et al. explored nail placement options in the hands and feet to determine what areas would cause the most pain if pierced by a nail¹⁴³. Regarding the hands, they concluded that nail insertion through the carpal bones of the wrist would not only best secure the individual to the cross but would also inflict the maximum pain due to the inevitable injury to the median nerve. Placement of the nail in this location would preserve the main vascular supply, without breaking the bones, facilitating hours or even days of torture without significant blood

¹³⁹ ZUGIBE 2005, 77.

¹⁴⁰ BORDES et al. 2020, 12/21.

¹⁴¹ EDWARDS / GABEL / HOSMER 1986, 1455/60.

¹⁴² BUCKLIN 1958, 5/13; LEWIS 1995, 10f.

¹⁴³ BORDES et al. 2020, 12/21.

loss¹⁴⁴. Unfortunately, the anatomical analysis of the feet conducted by BORDES et al. is problematic¹⁴⁵. Considering the statements of Josephus and Seneca that the Romans experimented with various crucifixion postures and techniques¹⁴⁶, absolute certainty of the location of nail insertion is impossible.

Implications

In Classical and Koine Greek, the term χεῖρ (*cheir*) did not exclusively denote the hand but could also refer to the wrist or forearm. This opens possibilities for interpreting the location of the crucifixion nails as being either in the hands or wrists, as suggested by ROBERT BRATCHER and EUGENE NIDA¹⁴⁷. In modern medical vernacular, the hand consists of three parts: wrist (8 carpals), palm (5 metacarpals), and fingers (14 phalanges) (pl. 1b).

The New Testament writers did not differentiate anatomically between the hand and wrist as evidenced by Act. 12,7. Luke (a physician) records that Peter's »chains fell off his hands«. Medically, the »hands« include his wrist, so Luke uses the same Greek word for hand, χεῖρῶν (*cheirōn*), while clearly referring to a wrist. John uses χεῖρας (*cheiras*, the plural of χεῖρῶν) when Jesus points Thomas to his pierced hands (Joh. 20,27).

It is highly unlikely that Luke made a mistake. He did not need to specify that he was referring to the chains falling off Peter's wrists, rather than his palms or fingers. Whether executioners nailed Jesus through his metacarpals, carpals, or between the *radius* and *ulna*, the anatomical distance between them is only a few centimeters.

As mentioned above, scant archaeological evidence limits researchers' certainty on the placement of Jesus's nails, but our analysis suggests that the executioner(s) likely placed the nails in the carpal bones of the wrist or between the *radius* and *ulna*. This area would have better supported him on the cross and would have inflicted the maximum amount of pain. However, ropes could have mitigated the effect of nails into the palm. The execution of Antigonus II Mattathias (Case 1) supports this possibility.

2. *Dorsum* of feet or heel?

Roman executioners commonly drove nails through bones during crucifixions, and we have demonstrated that this often did not result in breaking the *calcanei*¹⁴⁸. Therefore, there is no need to hypothesize, as do BORDES et al., that the nail(s) that pierced Jesus's feet entered from the *dorsum* to comport with the prophecy of the Passover lamb's unbroken bones (Num. 9,12)¹⁴⁹. EDWARDS, GABEL, and HOSMER hypothesize that the nails driven through the feet must have entered the top of the feet through the first or

¹⁴⁴ BORDES et al. 2020, 12/8.

¹⁴⁵ BORDES et al. 2020, 19. They cite BARBET's 1953 publication, noting that a 4.5 inch (11.4 cm) nail would suffice to penetrate both overlapped feet in crucifixion. However, they do not mention the nail size used in their anatomical study. Our model, featuring two overlapped feet representations, demon-

strates that a nail length of ca. 11/12 inch (28/30 cm) is necessary to penetrate both feet and securely anchor them into the *stipes*.

¹⁴⁶ Joseph. b. Iud. 5,451; Sen. ad Marc. 20,3.

¹⁴⁷ BRATCHER / NIDA 1961, 103.

¹⁴⁸ TZAFERIS 1985, 44/53.

¹⁴⁹ BORDES et al. 2020, 18f.

second intermetatarsal space, just distal to the tarsometatarsal joint (pl. 4b)¹⁵⁰. They correctly note that if the nail had entered the top of Jesus's foot, it would not have broken any bones¹⁵¹. However, their theory rests upon the presumption that the Romans crucified their victims with overlapped feet nailed together into the cross. This proposed technique contradicts the archaeological record and earliest artistic depictions but remains a possibility since executioners varied their methods as previously noted. The feet area of the crucified man in the Shroud lacks clarity.

Considering that three archaeological examples now exist of crucified victims with pierced *calcaneus* bones with no examples in which the nail entered through the top of the feet, we conclude that it is more likely that the executioner assigned by the *exactor mortis* nailed Jesus to the cross through his *calcanei* than through the *dorsum* of his feet, but both are possible. Case 2 probably occurred under Pontius Pilate's auspices in Roman Judea and is thus an excellent parallel for studying Jesus's crucifixion.

The nail found in Case 2 measured only 4.5 inch (11.4 cm) in total length (see table 1 below for a comparison of nail length and style in crucifixions). Some scholars, like HAAS, TZAFERIS, and YIGAL YADIN, hypothesize that the single nail (bent at the tip) found at Giv'at ha-Mivtar extended through both *calcanei*¹⁵². However, this nail would not have been long enough to pierce both heels; thus, it was more likely that the executioners used two nails to attach victims in a way where their feet straddled the cross¹⁵³. Regarding this, ZIAS and SEKELES correctly note:

The feet were not, in the authors' estimation, both anchored with one nail. The nail in the left foot was probably removed at the time of original burial. The nail in the right remains because the bend at the pointed end (which was probably caused by the nail hitting a knot in the wood as it was driven in) likely resulted in its not being removed in order to avoid doing further injury to the body.¹⁵⁴

<i>Crucifixion</i>	<i>nails found</i>	<i>approximate length</i>	<i>style</i>
Abba Cave (Case 1)	(3)	2.0/2.8 inch (5/7 cm)*	square, tapered
Yehohanan (Case 2)	(1)	4.5 inch (11.4 cm)	square, tapered
Gavello tomb (Case 3)	(0)	1.0 inch (2.4 cm) bone perforation length	round, possibly tapered**
Fenstanton (Case 4)	(1)	2.94 inch (7.5 cm)	round, tapered
Caiaphas tomb (Case 5)	(2)	3.2 inch (8 cm)	square, tapered

*Tips of nails broken off. – **Entry hole was 0.35 inch (9 mm) and exit hole was 2.6 inch (6.5 mm), indicating a tapered style nail.

Table 1. Nail length and style in known crucifixion cases (© Sarah Ferry).

¹⁵⁰ EDWARDS / GABEL / HOSMER 1986, 1455/63.

¹⁵¹ EDWARDS / GABEL / HOSMER 1986, 1460 fig. 5.

¹⁵² HAAS 1970, 58; TZAFERIS 1970, 18/32; YADIN 1973, 18/22.

¹⁵³ YADIN's assertion that people later referred to Yehohanan as »the one hanged with knees apart« reinforces the proposed depiction of crucifixion where the victim straddles the cross. See YADIN 1973, 22.

¹⁵⁴ ZIAS / SEKELES 1985, 190.

The difference between a pierced *calcaneus* and one that has been traumatically fractured, with or without displacement of the bone, lies in the unique characteristics of each trauma. A pierced *calcaneus*, particularly one penetrated by a nail, involves the nail passing through the bone without necessarily causing a fracture. This process is especially significant in the *calcaneus* because of its cancellous structure – meaning it has a softer, sponge-like interior, supported by a lattice of bony tissue that absorbs impact but remains more fragile than denser bone.

It is common for podiatric surgeons to place a screw(s) across a calcaneal fracture line to promote bone healing (pl. 4d). When surgeons place a screw through the *calcaneus*, they are not breaking the bone, rather they are piercing or penetrating it.

In the cases of pierced *calcanei* (Cases 2/4), only Case 3 presents a small ellipsoidal depressed fracture on the medial side. This suggests a more straightforward piercing. In Case 3, the condition of the bone surfaces – deteriorated due to post-depositional and diagenetic effects – complicates the interpretation of this fracture. Nevertheless, the nearly identical anatomical placement of the nail seen in Cases 2/4 indicates that crucifixion was the cause of these injuries. The small fracture at the entry point of the medial heel in Case 3 could have occurred *peri-mortem* or later, through natural erosion and degradation. If it did occur *peri-mortem*, it may have resulted from the nail being removed rather than inserted.

Implications

The presence of a nail in the *calcaneus* does not imply a fracture in the dramatic sense seen with *crurifragium*, as described in Joh. 19,31/3. The tapered design of nails pierced both tissue and bone, often without fracturing, unlike the blunt-force trauma of leg-breaking associated with rapid execution.

The notion of Jesus being pierced in his *calcanei*, not crushed, comports with an exegetical understanding of Gen. 3,15: »And I will put enmity between you and the woman, and between your offspring and hers; he (messiah) will crush your head, and you (serpent) will strike his heel« (NIV). JONATHAN CHEEK proposes that »strike« his heel connotes a snake bite, while »crush« his head conveys the lethal impact of a head wound, emphasizing the disparity between the two types of injuries foretold in the protoevangelium¹⁵⁵. The image of a nail piercing or striking through Jesus's *calcanei* portrays what he physically endured based on the archaeological, literary, and artistic evidence herein presented. Likewise, the crushed serpent's head is a powerful image of Satan's ultimate demise.

VI. Conclusion

The archaeological discoveries related to crucifixion add a lens for understanding the historical context of the biblical and extrabiblical crucifixion narratives and artistic depictions. Such findings often align with the details described in these texts and de-

¹⁵⁵ CHEEK 2021, 32.

pictions. Each archaeological case of crucifixion clarifies how such events may have transpired.

None of the gospel accounts of Jesus's crucifixion make explicit mention of how executioners attached Jesus to the cross. However, Thomas's statement that he needed to see and touch »the print of the nails« in the hands of the resurrected Jesus (Joh. 20,25) and Jesus's reference to his own »hands and feet« (Lc. 24,36/43; Joh. 20,19/25) demonstrate that an executioner nailed Jesus's hands and feet to the cross (Mc. 15,27; Mt. 27,38; Lc. 23,33; Joh. 19,18).

The archaeological record confirms the piercing of crucifixion victims' extremities, the extant remains illuminating some significant details, such as the likely positioning of the nails, which differs from most traditional artistic representations. Despite the numerous renditions of the crucifixion of Jesus with a single nail being driven through the *dorsum* of his overlapped feet and nails piercing the palms of his hands, no archaeological evidence supports this interpretation. Although Cases 2/4 reveal nailing through the *calcanei*, we cannot say for certain that Jesus underwent the same process. However, with three known examples of crucified individuals having had nails driven horizontally through their *calcanei* (pl. 4c), this was plausibly the case with Jesus. This interplay between text and archaeology contributes to a clearer understanding of the historical practice of crucifixion and also allows researchers to better visualize the way in which also Jesus probably was pierced. From a sociological perspective, this study requires grappling with human depravity. How could humans justify this brutal and widespread form of capital punishment, almost exclusively for the lower classes?

The unbroken bones of Jesus at the crucifixion hold profound theological significance, fulfilling the typology of the Passover lamb's unbroken bones (Ex. 12,46; Num. 9,12). Joh. 19,36 explicitly connects the preservation of Jesus's bones to these Scriptures: »These things happened so that the Scripture would be fulfilled: »Not one of his bones will be broken««. From a medical perspective, now, the piercing of a nail through the *calcaneus* bone also does not constitute a »breaking« or fracture. Thus, contrary to other researchers, we do not see the necessity for Jesus to have been nailed to the cross through the *dorsum* of his feet to fulfill prophecy, since the nails used to secure Jesus to the cross, piercing his flesh and possibly his bones, would not cause bone fractures, preserving the typological requirement of the Passover lamb¹⁵⁶.

The archaeological findings, combined with historical records and artistic depictions, offer a multifaceted perspective on crucifixion. They reveal not only the method's brutal nature but also its significance as a tool for control and intimidation within classical societies, shedding light on the complex interplay between law, society, and punishment in antiquity.

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¹⁵⁶ The assumption that Jesus could not have had nails driven through his *calcanei* because such an ac-

tion would contradict Joh. 19,36 rests on a mistaken idea of what constitutes a broken bone.

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The abbreviations employed for sources and biblical books adhere to the guidelines of the *Franz Joseph Dölger-Institut*, Bonn.

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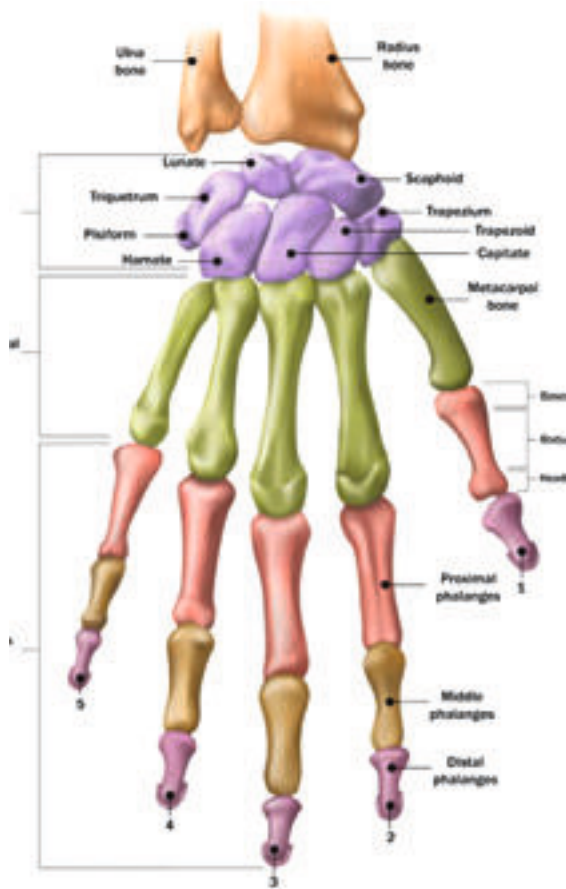
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Weblinks

- [URL-1]: <https://www.haaretz.com/archaeology/2014-04-29/ty-article/.premium/last-maccabee-found-after-all/0000017f-ea89-d3be-ad7f-faab513c0000>
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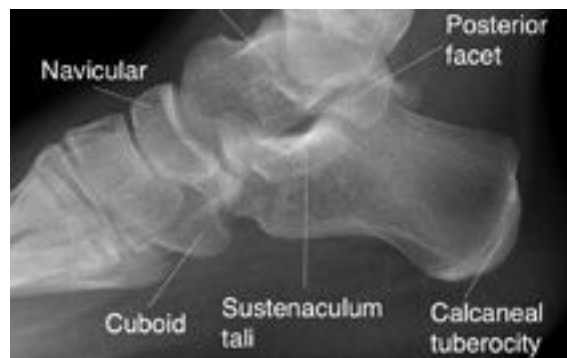
a. Anatomy of the human hand.



b. X-ray of a human hand.



c. Anatomical cross-section of the foot showing the tibial nerve within the tarsal tunnel.



d. Anatomical cross-section of the foot showing the *sustentaculum tali* protrusion.



a. Mandible fragment and *phalanges* of the Abba Cave victim still in contact with distal hand bones.



b. The *calcaneus* of Yehohanan, discovered at Giv'at ha-Mivtar.



c. Model of the Yehohanan crucified *calcaneus* alongside the actual artifact found *in situ*.



d. Model of Yehohanan's *calcaneus* secured to the *stipes* with olive wood plaque.



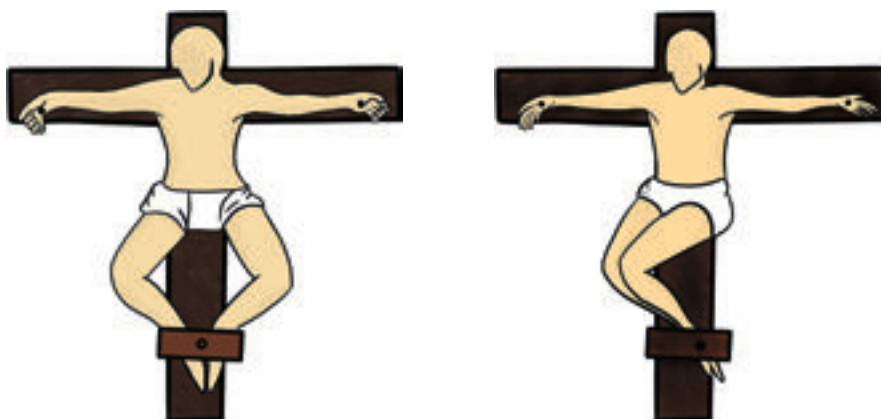
e. A pierced *calcaneus* of the Gavello crucifixion victim.



f. Detail: fracture at the point of entry.



a. Crucified victim found in Fenstanton with iron nail driven through the right *calcaneus*.



b. Two potential configurations for the nail having been driven from the medial (inside) part of the *calcaneus* to lateral (outside): 1. with the feet positioned side-by-side and nailed individually (left), and 2. with the feet overlapped and nailed together (right).



c. The so-called Pereire gem, ca. 1.2 × 0.8 inch (3 × 2 cm).



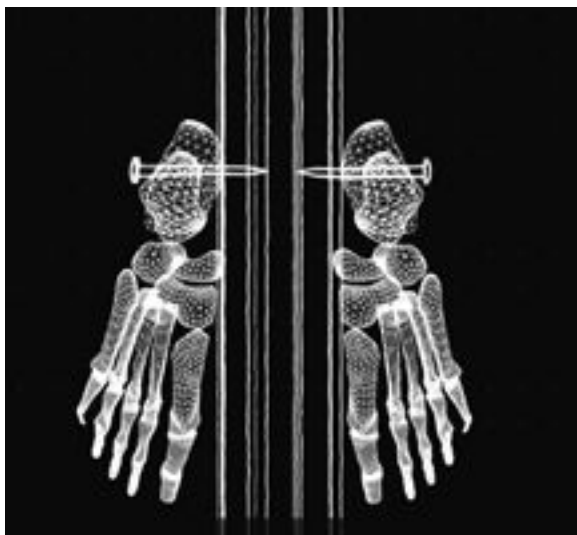
d. Depiction on a wine jug (*lagynos*) from the workshop of Navigius of an execution victim being attacked by an animal.



a. ›Destot's space‹, located between the carpal bones (specifically the lunate and capitate bones), BARBET's proposed location for nail insertion in the hand area.



b. X-ray illustrating the space between the first and second metatarsal bases often advocated as the nail location for Jesus's crucifixion.



c. Digital illustration depicting the placement of a crucifixion nail through the *calcaneus*, based on early artistic representations and archaeological evidence.



d. X-ray of a calcaneal fracture that has been internally fixated by a surgical screw.