

THE GREAT PLAGUE OF MARSEILLES (1720-1722): NEW ANTHROPOLOGICAL DATA

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Abstract

The anthropological study of a mass grave dating from the great plague in Marseilles revealed new results concerning 18th century medical practice during a severe epidemic.

Key words: apparent death, autopsy, biological anthropology, death verification, dissection, forensic anthropology, human osteoarchaeology, Marseilles, plague.

Introduction

The great plague of Marseilles accounted for about 50 000 victims in the alone town (CARRIERE et al., 1968). Corpses were buried in many graves scattered all over the town. Surprisingly, no anthropological studies have as yet been performed on these victims. A mass grave dating from this 18th century epidemic was recently discovered in the city centre, at the site of a planned housing development. A proposal for a complete anthropological study of this mass grave was submitted as part of our research proposal on the archaeology of human infections (DUTOUR et al., 1994a). The site was excavated in 1994. About 200 skeletons were taken out of this pit, which was dug at the time of the epidemic in the garden of the "Observance" monastery. A multidisciplinary (anthropological, paleopathological, historical and microbiological) study of this mass grave is in progress. The first results have provided the first evidence of the forensic practice used during this epidemic, observed in 2 neighbouring interments: verification of death by implantation of pins into the toes, and the first evidence of an autopsy performed during this epidemic, revealed by the opening of the skull of an immature skeleton.

Historical records

On the 25th of May 1720, the ship "Grand Saint-Antoine" returned from Syria to France, carrying the plague. The customary quarantine period was shortened, due to pressure from the town's financial community (BERTRAND, 1779), and this led to the introduction of the epidemic into Provence. The spread of this epidemic killed 100 000 persons in the region. In Marseilles, the number of deaths was about 50 000, corresponding to about half of the population. During the height of the epidemic, from June to August, the streets of the old city were covered with 7000 - 8000 corpses (BIRABEN, 1975). The epidemic lasted from June 1720 to August 1721. At the beginning of the spring of 1722, an epidemic relapse was observed. The number of reported victims of this second outbreak varies: 260 sick persons and 194 deaths according to MERY and GUINDON (1848); 174 victims according to CARRIERE et al. (1968); 700 people affected according to COLONNA D'ISTRIA (1968); but never as many as 1000. The city was again isolated. Some monasteries were again converted into hospitals, including the convent of the Augustines for the nobility, whilst common people were placed in the Charity. The convent of the Observantines was used as a hospital for quarantine. From the 18th to the 24th of May 1722 (CARRIERE et al., 1968; DUTOUR et al., 1994b), 50 peasants were recruited to dig a grave in the gardens of this convent, a pit large enough to accommodate 20 000 corpses. This mass grave was used from May to August 1722. It is the one we excavated in 1994.

Materials and methods

The excavation of the mass grave of the plague victims of the Observance hospital was performed in two steps (AFAN 210134062):

- The first step, in August 1994, was devoted to the collection of the bulk of the osteoarchaeological data (175 skeletons). Skeleton S 55 was collected in this first step, the anatomic practice was identified in the laboratory.

- The goal of the second step, from September to October 1994, in the central area of the pit, was to obtain additional data on the mode of interment of plague victims. Two of us (O. D. and M. S.) performed a planimetric excavation on a limited area and charted the precise positions of the skeletons found. This very careful technique, involving the same methodology as that applied to prehistoric digs, allowed us to observe the pins in place in the articular space of 2 of the 22 skeletons found in this area (SIGNOLI et al., 1996).

In the field, excavation was performed by the generally accepted method of field anthropology (DUDAY et al., 1990). Individual data on each skeleton were recorded and the precise orientation was charted on a general map. We analyzed the precise position of the skeleton in the field in order to determine the chronology of the burial, and used forensic methods to interpret the states of rigor mortis processes. In the laboratory, age and sex determinations were performed through use of a combination of different techniques from anthropology and forensic science (BRUZEK, 1992; BUIKSTRA et al., 1994; ISCAN, 1989). Reconstruction of the pin implantation process on a cadaver's toes was performed by using a similar needle. Reconstruction of the cranial autopsy was performed on an anatomical specimen, using an old bone-saw according to a medical treatise from the 18th century.

Historical research was carried out by one of us (M. S.) in the archives of the city in order to authenticate and date the mass grave, and in the old medical treatises of 17th and 18th centuries in order to document the different forensic and autopsy techniques used.

Results

S 155 and S 158: Our work revealed the presence of a bronze pin *in situ* in the of the two neighbouring skeletons (numbers S 155 and S 158, Fig. 1). In the case of S 155, the point of the pin touched the distal tip of the first phalanx, at the anterior and inner part of the articular area, at an angle of about 30° to the axis of the first phalanx, in the horizontal plane (Fig. 2). In the case of S 158, a Roman concrete block weighing around 40 kg was positioned on the distal skeleton of the lower leg. The floor of a roman *domus* was destroyed by the gravediggers in May 1722. After the removal of this block, we discovered, *in situ*, a twisted bronze pin in close contact with the phalanx of the right big toe (Fig. 3).

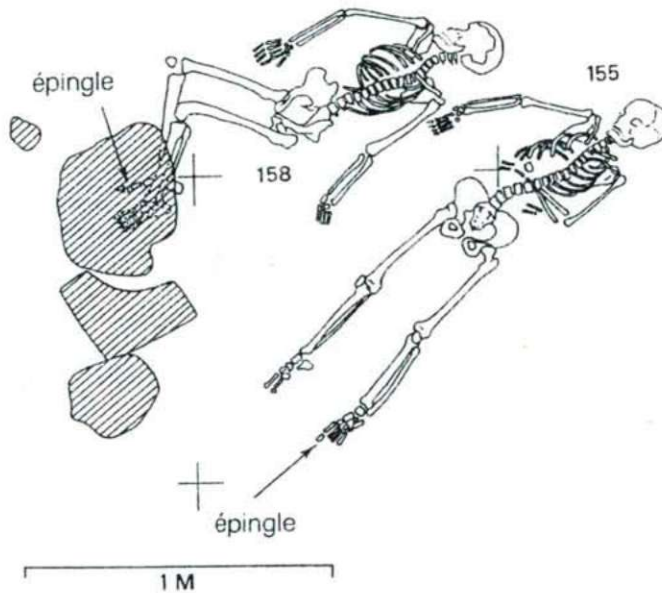


Fig. 1. A close view of the burial positions of skeletons S 155 and S 158 (drawing by J. DA SILVA and Y. ASSIÉ).

The presence of such pins associated with these two skeletons, clearly observed in the articular space, cannot be interpreted as fortuitous, or having occurred, for example, during the fixing of the shroud, but clearly indicates a deliberate act. The historical records revealed that, during this epidemic, the shroud was only sewn and not fixed by pins (BIRABEN, 1975). The positions of the skeletons did not reveal any *post mortem* changes; every part of the skeletons was perfectly in place.

S 55: In the central area of the pit, skeleton S 55 was that of an adolescent (about 15 years old), probably male and buried between two adults. The skull of the skeleton had been partially destroyed by the weight of the mechanical shovels, before the

beginning of the excavation of this area, and the lack of the cranial vault was not noticed in the field. However, the horizontal section of the skull is clearly visible on the pictures taken in the field (Fig. 6).



Fig. 2. S 155, showing the bronze pin in place, touching the distal tip of the first phalanx at the anterior and inner part of the articular area (photo by M. SIGNOLI).

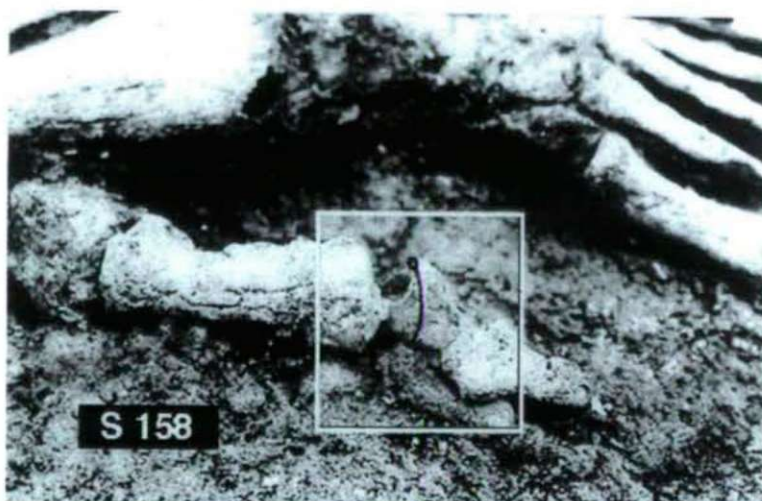


Fig. 3. A twisted bronze pin discovered in place in contact with the first phalanx of the right big toe of S 158 (photo by M. SIGNOLI).

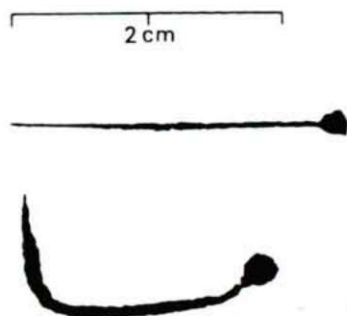


Fig. 4. The two bronze pins discovered in place in the toes of the neighbouring skeletons S 155 and S 158 (drawing by Y. ASSIÉ).

The reconstruction of the skull in the laboratory showed that the section is perfectly horizontal, starting from the supraglabellar area to the lambda, going just above the squamous part of the temporal bone (Figs 7 and 8). A small angulation of the section line is observed in the temporal area, and a tiny line, located just above this section line, is present in the frontal area and in the left lateral part of the skull. These data allow the conclusion that the section was performed with a bone-shaw after the preparation of a guideline. The regularity of the section line attests to the perfect technique of the surgeon (DUTOUR et al., 1995; DUTOUR et al., 1996).

Discussion

S 155 and S 158: The method of implantation of these pins was better understood after a reconstruction on an anatomical specimen, using needles of similar length and diameter (SIGNOLI et al., 1996). In the first case (S 155), the position and orientation of the pin observed in the field led us to believe that the pin had been introduced under the big toenail (LEONETTI et al., 1997). The reconstruction showed us that in this method, if the pin is almost completely driven under the nail, the extremity of the pin comes into contact with the distal part of the first phalanx, on the anterior part of the articular surface. The angle with the axis of the first phalanx in the horizontal plane is due to the hyperextension of the distal phalanx on the proximal one. In the second case (S 158), the mode of implantation is more complex: a very similar position was obtained by the introduction of the pin outside the *extensor hallucis*, in close contact with the bone of the phalanx, and it was then bent over the big toe (LEONETTI et al., 1997). By this method, we obtained the same curvature of the pin (Fig. 4).

The historical data at the end of the 17th and the 18th centuries revealed that in France there was a fear of "false death" and the burial of living people. This anxiety was based on a corpus of popular legends, and on the writings of classical authors. PLATO (the Laws, XII, 959) evoked the necessity of burying corpses only after 3 days of

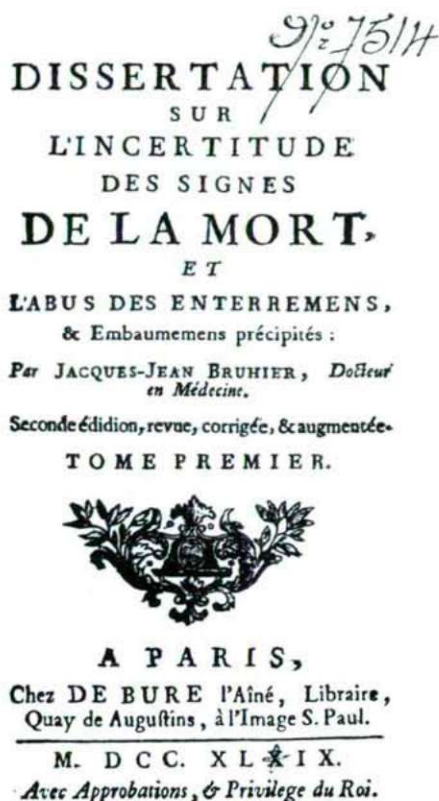


Fig. 5. Frontispiece of the medical treatise on forensic techniques by BRUHIER D'ABLAINCOURT (1749).

exposure, in order to differentiate a real death from a lethargy. PLINY (Hist. Nat., VII, 53) quoted a case of revival during cremation. This image was reinforced in the 16th century by descriptions of cases of false death, such as a premature dissection of a woman by the famous anatomist VESALIUS (PARE, 1573). In the second half of the 17th century and in the 18th century, testamentary writings revealed a great number of requests for a public and prolonged exhibition of cadavers in order to verify the reality of death (ARIES, 1977). At that time, physicians reported on cases of false death, sometimes followed by premature burial or dissection. During epidemics, and especially during the plague, the risk of burying still-living people was increased, due to the necessity of rapid burial in order to avoid contagion (ZACCHIAS, 1651; LANCISI, 1707; BRUHIER D'ABLAINCOURT, 1749). Certain sanitary rules prescribed that the funeral had to be carried out during the first 6 hours following death (BIRABEN, 1975). However, during the plague epidemic in Marseilles, the rules specified that the grave-diggers could not take any cadaver without the authorization of the person in charge of the hospital (PAPON, 1800). It is noteworthy that the plague epidemic provoked an

indifference to the true state of cadavers (MILANESI, 1991). BRUHIER D'ABLAINCOURT (1749) (Fig. 5) reported the answer, made in the Provençal language, of a grave-digger who was putting a still-living man into his "tombereau" with cadavers: "*es proun mouert*", that is to say: "*he has sufficiently died*". This practice is also attested to by Roux: "*..les forçats qui entraient dans les maisons pour en sortir les morts pillaient de tous côtés et s'il sy trouvait un moribond, témoin de leurs larçins, ils avaient le secret de l'étouffer et de l'emporter dans leur chariot .. d'autres, ayant perdu tout sentiment d'humanité avaient la cruauté dy jeter des mourants lorsquils se trouvaient à portée*".

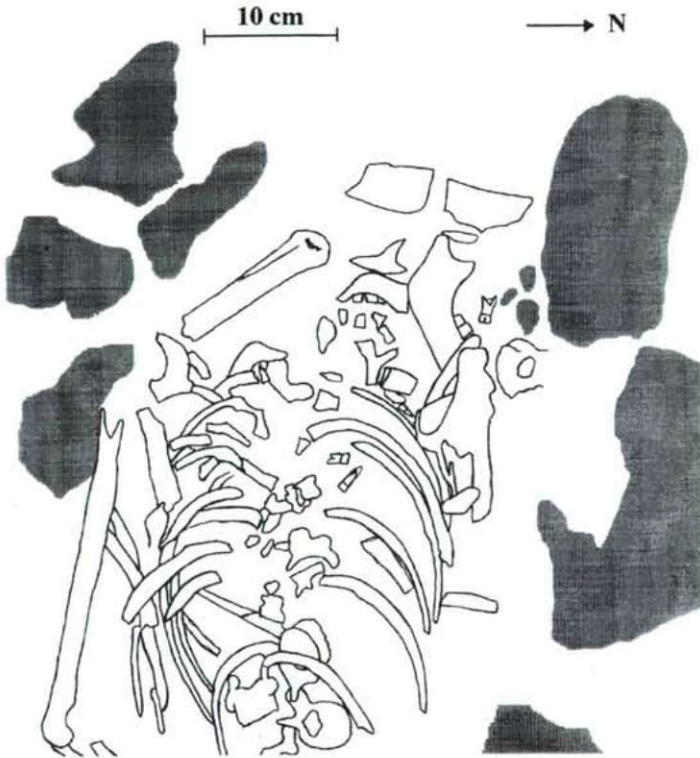


Fig. 6. S 55, burial position in the field (drawing by M. SIGNOLI).

To avoid these premature burials, many tests of verification were described by the physicians (ZACCHIAS, 1651). Among these techniques for verification of death, one notes the "surgical" methods, including cutting, burning or implantation of pins on the palmar surface of the hands, or the scapular area, or under the plantar surface of the feet, and the implantation of pins under the toe nails (*aciculam sub ungue digiti pedis*) (ZACCHIAS, 1651; BONET, 1679; LANCISI, 1707; WINSLOW, 1740; BUFFON, 1749). According to WINSLOW (1740), the reliability of these surgical techniques was as poor

as that of the other methods in use. The conception shared by physicians since the 17th century was that, except for the first signs of putrefaction, nothing was truly reliable for the diagnosis of death: *ait, hominem vere mortuum non nisi incipiente putredine cadaveris certo cognosci posse* (ZACCHIAS, 1651).

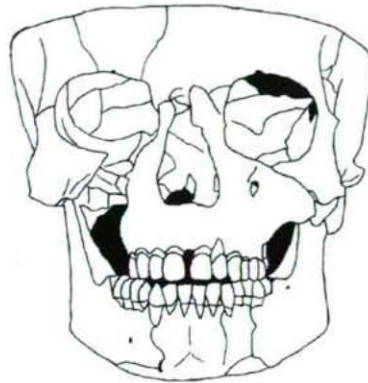


Fig. 7. S 55, anterior view of the skull (drawing by M. SIGNOLI).

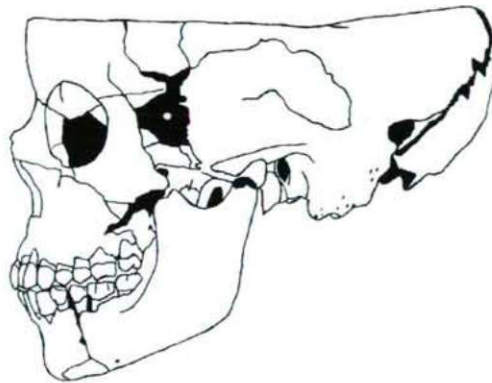


Fig. 8. S 55, left lateral view of the skull (drawing by M. SIGNOLI).

S 55: At the beginning of the 18th century, autopsy was a well-known and quite old medical practice. According to PROCOPE, in 542, during the plague epidemic in Constantinople, some physicians died rapidly after they performed autopsies (*Bellum Persicum*, II, 22). Several engravings testified to the opening of the corpses during the medieval period. Such dissections were performed during the 16th, 17th and 18th centuries, and followed very precise rules described in anatomic treatises (Fig. 9). Three parts of the body were regularly opened: the abdominal, thoracic and cranial cavities "On apporta à l'Infirmierie le 17 janvier de cette année un homme de trente ans,

qui mourut de la peste. Le bas-ventre étant ouvert, on vit l'épiploon parsemé de taches pourprées, la rate verdâtre... La poitrine étant ouverte, le poulmon se trouva fort gonflé, d'une couleur livide, rempli d'un sang noirâtre & écumeux... Le crâne étant ouvert, nous trouvâmes la dure mere enflammée à la partie de cette membrane qui est sous la fontaine, & le sinus longitudinal vuide & desséché..." (Letter from Doctor CROUZIER, May 1722, in SÉNAC, 1744).



Fig. 9. Headline of A. VESALIUS (1539).

However, the skull was sometimes not opened, because it needed special tools (Fig. 10): "*Je l'ouvris le matin (le cadavre d'une femme morte dans la nuit de la peste), vers les huit heures, & je me contentai d'examiner la poitrine & le bas ventre, parce qu'alors, je manquais d'instruments pour scier le crâne, & que nous n'avions remarqué aucune lésion à la tête.*" (CHICOYNEAU et al., 1720).

The skull was opened according to the following protocol: incision of the scalp in two steps (sagittal and frontal), and opening of the skull with a bone-shaw after the drawing of a guideline (DEIDIER, 1742).

Conclusions

These two discoveries are the first anthropological evidence of medical practices during past epidemics, in this case the great plague in the first quarter of the 18th century. The medical treatises of the 17th century carefully described many forensic techniques to verify whether death was real and permanent, and in particular the

implantation of pins into the toes. It should be noted that the main cause of apparent death is presented in the same medical treatises as the plague. The anatomical treatises and wood engravings since the 15th century attest to the practice of autopsies. This discovery is the first osteoarchaeological evidence of the performance of this practice during an epidemic of plague. This observation leads to the question of the notion of contagion of the plague. This notion was paradoxically commonly admitted by the sanitary system since the 15th century, but surprisingly disputed in the 17th century by some medical authorities, e.g. the physician of the Regent. This non-contagious theory allowed the performance of normal autopsies in this very dangerous context. This result underlines the efficiency of collaborative researches between biological anthropology, archaeological and forensic sciences in the understanding of medical behaviour and past epidemics.

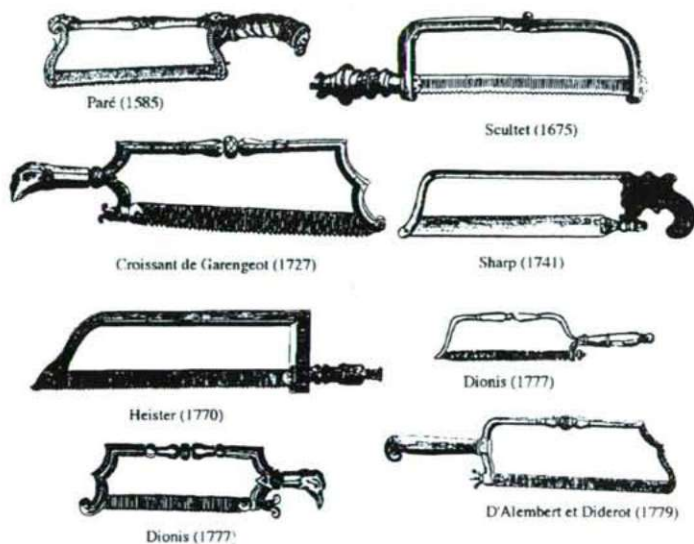


Fig. 10. Bone-shaws used during the 16th, 17th and 18th centuries.

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