Trephination: The Earliest Case in the Middle East

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INTRODUCTION

Trephination may be defined as the removal of a piece of the skull of a living individual without penetration of the underlying soft tissues (Lisowski 1967). The vast literature on the subject was reviewed by Guiard (1930), Piggot (1940), Stewart (1958), Margetts (1962) and Lisowski (1967), and indicates that this practice was apparently world-wide. The oldest examples of trephination are reported from the Neolithic age of France, ca. 3000 B.C.E. (Piggot 1940). One case of trephination from Epipaleolithic times was also reported, from the site of Taforalt in Morocco (Ferembach 1962), but Lisowski (1967), in his vast survey of prehistoric and early historic trephination, did not mention it, and considered all claims (e.g., Moodie 1923) for trephinations prior to the Neolithic age as hypothetical. The occurrence of trephination was most frequent in Peruvian skulls (Stewart 1958; Allison et al. 1967).

Four general techniques appear to have been used in trephination: scraping away the bone; boring a hole with a drill; making a circular hole with a cutting tool; and cutting or sawing a rectangular hole (Lisowski 1967; Vreeland and Cockburn 1984). Three "reasons" for carrying out the procedure have been proposed, as indicated below.

a. *Religious rite.* Muniz and McGee (1897) long ago suggested that trephination was initially performed on slain enemies in order to obtain amulets, and later the procedure was gradually carried out also on living captives for the same vicarious purpose. The cult or religious basis for trephination was also discussed by Guiard (1930) and Oakley et al. (1959).

b. *Traumatic and/or pathological indication requiring therapy.* This explanation is considered the most probable by palaeopathologists who believe that only extreme pain could be a sufficient motive for submitting an individual to the surgical remedy of opening the skull (Moodie 1923; Piggot 1940; Zivanovic 1982). The pain may have

been the result of head injuries, headaches, intracranial diseases, etc. This motive is also the most common among populations that still practice trephination today (Wolfel 1925).

c. *Magico-medical practice.* The removal of a piece of skull may have been effected in order to release a presumed demon (Castiglioni 1941). It has been suggested (Guiard 1930) that in ancient times intracranial diseases were ascribed to evil spirits and therefore cure was obtained by letting these out of the skull.

Indeed, trephination may have been employed at different times for all of the abovementioned reasons.

TREPHINED SKULLS FROM ISRAEL

Compared to the numerous cases of trephined skulls recovered in South America and Western Europe, the number of cases reported in the Middle East is quite small, especially in view of the thousands of skulls from different periods recovered in archaeological sites during the last century.

The first archaeological evidence for the practice of trephination in ancient Israel comes from reports of Starkey (1936) and Parry (1936) on the recovery of three trephined skulls from a 7th century B.C.E. ossuary at Tell Duweir (Lachish). A further case belonging to the same site was later reported by Giles (1953). A trephined skull was found in a tumulus (tomb) near Timna, roughly dated between the 6th century B.C.E. and the 3rd century C.E. (Ferembach 1957). Another case of trephination was found in a skull from the Hellenistic–Roman period in Acco (Goldman 1961). Two skulls, one possibly representing pseudo-trephination, were found in a Middle Bronze I (ca. 2000–2200 B.C.E.) tomb in Jericho (Brothwell 1965). Four trephined skulls were also found in a Roman cemetery in the Jordan Valley near Jericho, although one of these was unfortunately "lost" (Zias 1982). Three questionable cases of trephination, not yet published, are known from Azor (Early Bronze), Yavneh-Yam (Iron Age) and Quarantal (Roman period) (B. Arensburg, personal communication).

In regard to Egyptian skulls, most intentional openings of the braincase were probably made after death in order to extract the brain before embalming (Zivanovic 1982). This was probably a necessity for thorough mummification (Ascenzi et al. 1984), and therefore can scarcely be considered as trephination.

It should be noted that a very different surgical procedure was necessary for rectangular trephination, such as appears in the crania from Lachish or Timna (Fig. 1) than for removing circular roundells (e.g., Jericho and Acco) (Fig. 2). These variations would seem to suggest different reasons for carrying out the procedure.

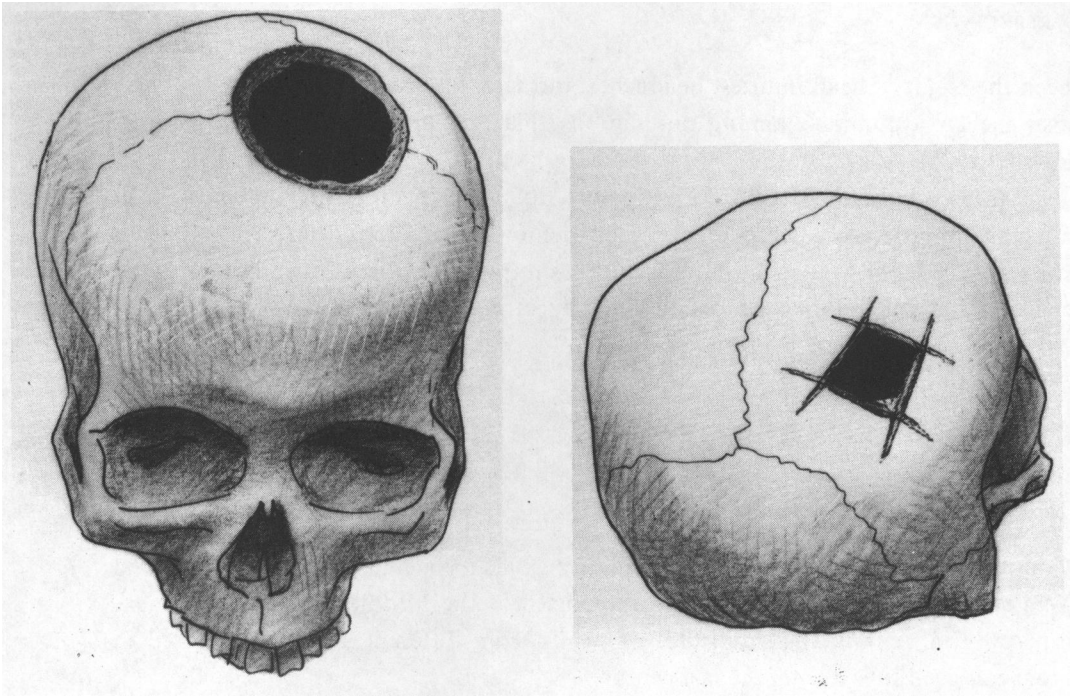

Fig. 1: Rectangular trephination in Lachish and Timna skulls.

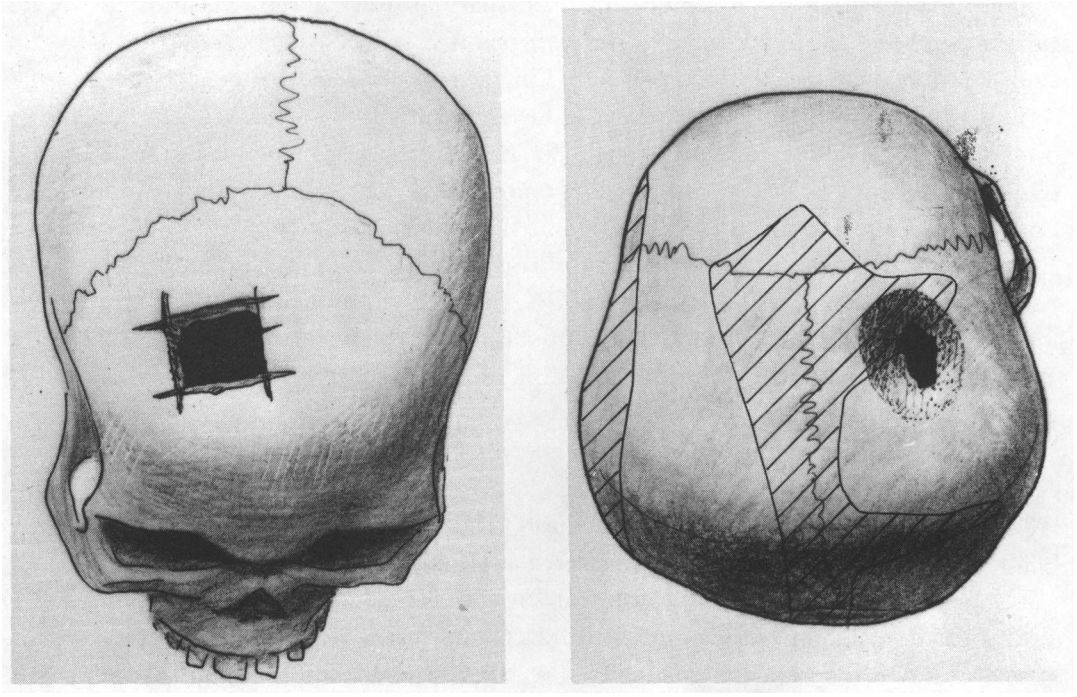

Fig. 2: Circular roundells removed from Jericho and Wadi Hebran skulls.

THE PRESENT CASE

A trephined skull was found in a burial structure known as *nawamis* (Bar-Yosef et al. 1977, 1983) located in a large cemetery at Wadi Hebran, South Sinai (Fig. 3). The *nawamis* are among the most outstanding archaeological remains of this peninsula. They were built during the 4th millennium B.C.E. by indigenous pastoralists and were used as family tombs. The builders were probably among the first human groups to develop the pastoral strategies of adaptation in these arid zones, today represented by the Bedouins (Goren 1980; Bar-Yosef et al. 1983).

The skull was found in tomb number 105, which contained the remains of six individuals (five adults and one child). It belongs to the only skeleton in the tomb fully articulated (Homo I), lying on its right side in a semi-flexed position (Fig. 4). The remains of all other adult individuals were pushed towards the wall together with any personal belongings (Fig. 5). These conditions seem to clearly indicate that Homo I was the last to be introduced into the grave.

The skull was excavated in a very fragmentary condition. Only part of the calotte could be reconstructed. It probably belonged to a male individual, about 35–40 years of age. There is no evidence of disease, although the facial region is twisted slightly to the right side. Other than the trephination, no premortem injury was noted. In this

Fig. 3: A *nawamis* tomb; through a small opening, facing the sunset, the dead (or their bones in cases of secondary burial) were brought into the grave.

Fig. 4: *Nawamis* no. 105. Homo I was placed in the center; remains of previously interred individuals were pushed towards the walls.

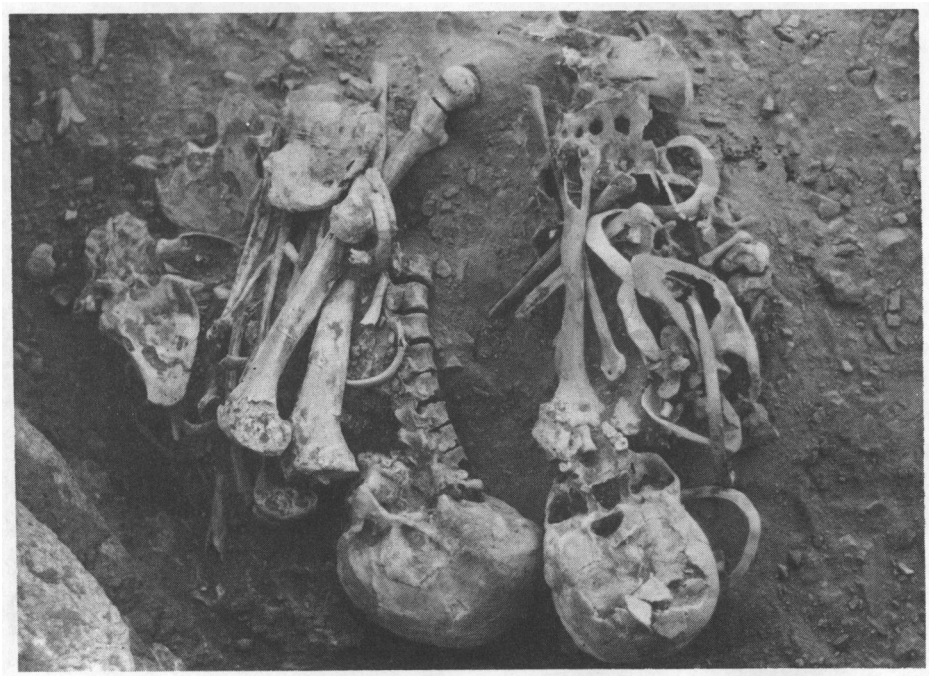

Fig. 5: Skeletons pushed towards the wall together with their belongings.

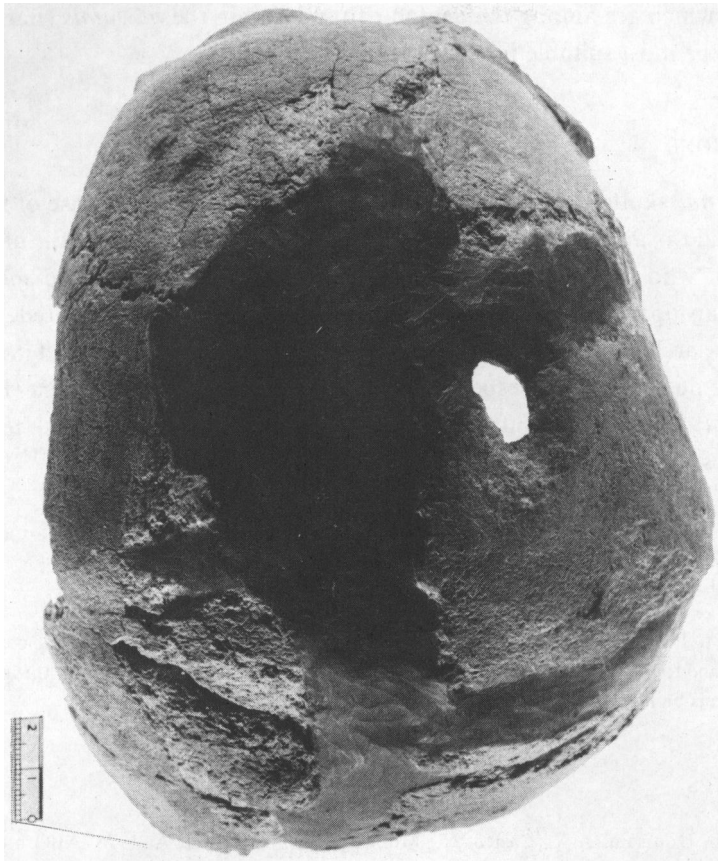

Fig. 6: Trephination of Skull I from Wadi Hebran.

skull, a prominent trephined hole was located on the anterior part of the parietal bone near the bregma. Regrettably, the parietal bone was only partially preserved. The trephination seems to have been oval in shape, bevelled on the outer edges, which suggests the operation was "successful", that the individual lived after the surgery long enough for the healing process to take effect (Fig. 6). Its outer diameter is much greater than the inner: the actual length of the hole is 10 mm internally while the external surface of the depression is 23 mm. The general funnel-shaped inclination of the sides of the depression is moderate.

A second hole was located on the most lateral right side of the coronal suture. In all aspects it resembles the hole already described, and may well have been an additional instance of trephination. These two trephinations were most likely performed with the aid of an instrument made of flint. The bevelled edges of the opening suggest that the "scraping technique" was used (Lisowski 1967). Side or end

scrapers, which are among the artifacts found within the *nawamis* (Bar-Yosef et al. 1977) can be most suitable for such a purpose.

CONCLUSIONS

The *nawamis* skull described here represents the earliest known case of trephination in Israel and is among the earliest in the world. The ability and skill of the ancient "surgeons" who almost 6000 years ago, with the crude tools at their disposal, carried out such an operation with apparent success, cannot but be admired. Indeed, the cumulative archaeological and anthropological information presented in recent years on ancient desert societies, especially concerning the *nawamis* builders (Bar-Yosef et al. 1977, 1983; Goren 1980) testifies to an advanced cultural and technological capabilities.

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