

## Adaptation of archaeological techniques in forensic mass grave exhumation: the experience of 'Chemmani' excavation in northern Sri Lanka

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### Abstract

There have been several mass grave excavations in Sri Lanka during the period of 1995 to 1998. Excavation of mass graves in the Chemmani area of northern peninsula of the country took place in September 1999, after about 5 years of the incident. Six graves with 1 to 6 bodies in each were identified and excavated in accordance with archaeological methods modified to suit the requirements of forensic exhumations. The experience gathered from excavation of those sites revealed the importance of archaeological methods in mass grave exhumations. For the first time in our forensic history, services of archaeologists and soil experts were used in the Chemmani exhumation. Their knowledge was found useful in locating the pit, pedestalling, and collection of human remains without causing any damage and artefacts, and in recording of the data.

### Introduction

The term mass grave refers to a burial site, which contains a number of dead persons. It might be reasonable to assume that any burial site which contains more than one dead body, is a potential mass grave. Several mass graves in Sri Lanka were excavated during the period 1995 to 1998. Excavation of mass graves in Chemmani in the northern peninsula of the country took place in September 1999, about 5 years after the incident. Chemmani graves were located in the southern municipal boundary of the Jaffna, the northern capital of Sri Lanka.

The approximate locations of gravesites were shown by the 5 informants (prisoners) who participated in extrajudicial execution of the victims. However, out of 25 locations pointed out by the informants only 6 graves, situated in close to the Chemmani check-point, contained 15 human skeletons (Figure 1, black dots). The experience gathered from this project indicated the importance of archaeological knowledge in mass grave excavation. For the first time in our forensic history, a group of archaeologists from the Department of Archaeology and a soil expert from Peradeniya University were involved in this mass grave exhumations. The present paper deals with the technical issues related to mass grave excavations, adopted

especially in Chemmani site and highlights the usefulness of archaeological methods in forensic excavations.

Excavation of Chemmani gravesites was conducted under tight security cover provided by the armed forces because the area was still under attack. A number of independent observers who represented the Physicians for Human Rights, Amnesty International, University of Jaffna, and diplomatic missions of USA and Canada, were present almost throughout the procedure, which lasted for about four weeks.

### Methodology

The following steps were followed in the excavation process.

1. Preliminary survey and observation of the site, and logistical arrangements were made several months before the commencement of the excavation [1]. The perimeter of the excavation site was demarcated with plastic tapes. Only technical staff was allowed to be in this area.
2. Detection of the grave. The archaeological technique of locating a pit, in Chemmani excavations, was based on the difference of the colour and the texture of soil layer immediately under surface. The uppermost layer of surface soil that has been deposited during the period of 5 years after the incident was removed manually or by using a backhoe loader in the case of a large area. This layer was not more than 30 cm in most of the graves (Figure 2). The margin of the original pit became visible after skinning of the surface soil and cleaning the area with brushes. This margin of the grave appeared as an area of mixed soil with a cracked border, darker in colour and softer in texture (Figure 3).
3. Recording of the grave was done by using photography, video, global position systems and scaled sketches on draft sheets. The graves were numbered as G-1, G-2 etc, and the skeletal remains were labelled as G-1: S1, G-2: S2, G-2: S3 etc. The location of the pit was recorded on ordinary graph paper according

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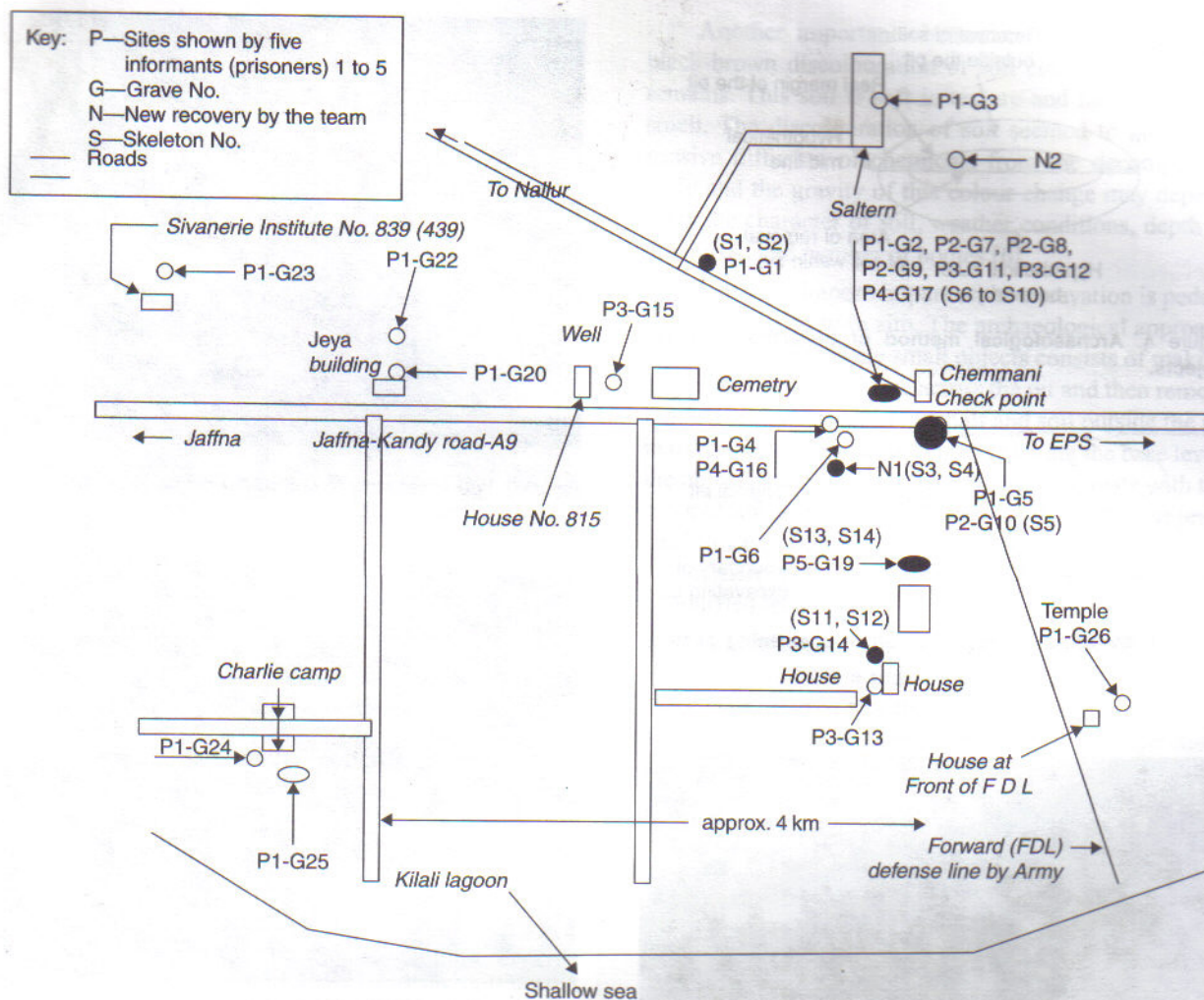


Figure 1. Sketch map of Chemmani and Kolombuthurai areas (not to scale).

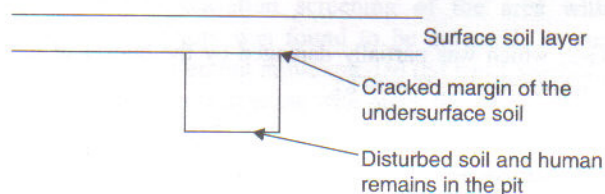


Figure 2. Cross-section of the grave.

to scale, and with an indication of direction by using a compass. The exact situation of the pit was recorded on the survey map of the Chemmani area.

#### 4. Excavation of the grave.

The following modified technique was adopted by our team.

A hypothetical boundary was drawn around the grave, which is larger than the real margin of the pit in three sides, and overlapping with the real boundary on fourth side (Figure 5). Surface soil was removed in that area in 15 cm layers by using mammoties. When brownish black discoloured soil with soft texture appeared, indicating that the human remains were very close, further removal of soil was performed by using small masonry scoops and wooden sticks, carefully.

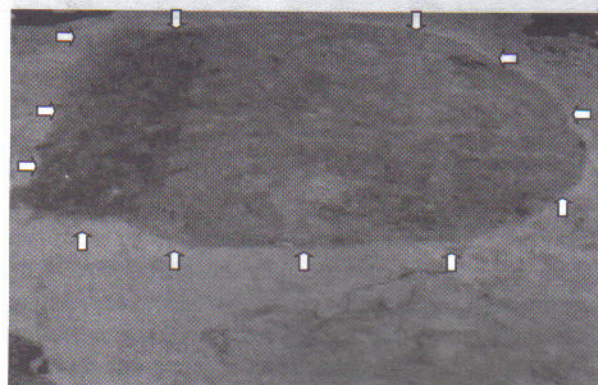


Figure 3. The actual margins of the grave are visible as a dark brown patch after removal of the surface soil (arrowed).

The skeleton was exposed with soft paint-brushes. Hands and feet of the skeleton were kept in a clump of soil without exposing and cleaning it. Finally, complete pedestalling of the body was done (Figure 6).

#### 5. Recording of findings the position and the depth of burial of the remains were recorded by using photographs, video and graph papers. The apparent

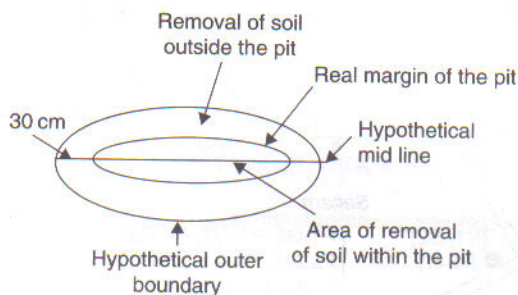


Figure 4. Archaeological method of unearthing smaller objects.

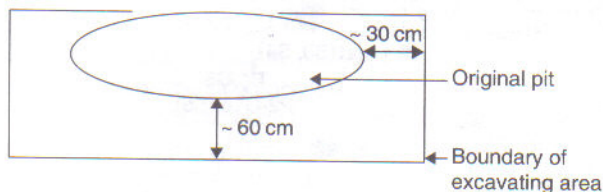


Figure 5. Modified forensic method of unearthing skeletal remains.



Figure 6. Complete pedestalling of the body.

height, injuries, and the number of bones were also recorded in situ.

The soil taken out from the pit was further examined for the trace evidence, especially those from close surroundings of the body, by using dry and wet screening through a 3 mm mesh (Figure 7). Removal and collection of skeletal remains was done in accordance with standard forensic practice. Labelling and dispatching of remains to the laboratory was done after packing them in thick polythene bags. Further excavation of bottom of the pit was done to confirm the absence of further remains.

## Results

Fifteen bodies were recovered in 6 separate graves. The recovery of over 95% of bones in respect of each skeleton justified the success of our methodology. The remains were surfaced without causing any damage or mix-up of bones, except in one skeleton from the gravesite



Figure 7. Wet screening of soil under direct observation.



Figure 8. De-skinning of surface soil with backhoe loader under close supervision of forensic experts.

G-2, which was partially damaged by the bucket of the backhoe loader (Figure 8).

## Discussion

The success of exhumation depends upon the technical procedures as well as on other physical and biological factors [3]. The most difficult part of the excavation is the determination of real boundaries of the grave. The approximate location of the grave is found on the data given by the informant. The information might be genuinely inaccurate, because most individuals, including active participants in the crime are unable to locate the exact place of the incident after several years. The current methods of detection of the pits are examination of difference in the vegetation, disturbance of surface soil, heat effect of decomposing human remains, detection of high methane in the gravesite, ground penetrating radar, trenching, probing with soil auger (Figure 9), and de-skinning of surface soil [4]. Each method has its advantages, disadvantages and limitations. For example, ground penetrating radar is less effective in salty areas, as in this case. The Chemmani site is bare low level coastal land



Figure 9. Probing with soil Auger.

without much vegetation. The probing with soil auger is limited to a couple of feet, and carries the potential risk of causing damage to the remains. The de-skinning of surface soil layer was practiced in Chemmani and found to be useful. However, it failed to show margins of one pit when the body was buried above the ground level by covering it with clay-like soil (G11 and 12). In that case, better aeration of the soil and effects of the rain during 5 years may have diminished the black-brown discolouration of soil even close to the remains [5].

The pre-excavation screening of the area with explosive detectors was found to be essential. In our case, two activated but non-exploded old hand grenades were recovered by screening with metal detectors, within the excavation field.

Removal of surface soil may be performed with heavy equipment like a backhoe loader. This is not recommended where the remains appear to be superficial. Two superficially buried bodies (G2) were damaged by the bucket of the machine. However, use of heavy equipment will save valuable time of experts and the manual labour force, which may often be limited. The continuous and close supervision by one of the experts is vital to avoid damage to the remains when heavy equipment is in operation.

Removal of soil in 15 cm layers is a laborious exercise, but minimizes possible chances of damage to the body, prevents loss of smaller bones, and is essential to determine the presence of foreign objects at particular depths. The removal of soil in an area two to three feet larger than the actual diameter of the grave on one side of the grave, is important because it creates comfortable working space around the remains, and facilitates side access to the remains.

Another important observation is the remarkable black-brown discolouration of soil close to the human remains. This soil is soft in texture and has a different smell. The discolouration of soil seemed to be due to passive diffusion of chemicals from the decomposing body and the gravity of this colour change may depend upon the character of soil, weather conditions, depth of the burial, and number of bodies [6].

The most important part of the excavation is pedestalling of the body in situ. The archaeological approach in unearthing relatively small objects consists of making a hypothetical central line across the pit and then removing soil within the pit in one half and soil outside the pit in the other half (Figure 4). After reaching the base level, the object could be taken on to the metallic plate with the block of soil at one side [2]. This method could not be practiced in cases of human remains, because human skeletons consist of over 200 separate bones, and we had to use a modified technique.

The removal of soil and dust by using wooden sticks and soft brushes is a time consuming exercise [7]. Our experience showed that the involvement of two persons in respect of each skeleton is optimal for this operation. Involvement of more than two may lead to accidental displacement of the remains while cleaning. Special care had to be taken to prevent any misplacement of teeth and smaller bones of the feet and hands. The bones of the hands and feet were kept in the clump of earth until removal of the remains. These smaller bones were taken after screening of the soil clump through the 3 mm mesh. This helped us to collect the maximum number of bones in every skeleton. The remains buried in clay-like soil were recovered by wet screening through the mesh.

Recording of position of the body in a draft paper is another important concept borrowed from archaeological practice. The graphical drawings have the advantages of accuracy in recording of position of the remains, easy reconstruction and feeding them into computer programmes.

## Conclusions

1. The adaptation of archaeological methods for forensic mass grave exhumations has several advantages [8]; easy detection of situation of the pit, pedestalling of remains without causing any damage, and accurate recording of the data.
2. This practice is useful as forensic pathologists and archaeologists exchange their experience as a multidisciplinary team.
3. Archaeological excavation is a time consuming exercise, which requires significant manual labour.

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## Papers

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