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Challenging of Commingled Human Remains in Mass Grave

Ahmed Kadhim Mohammed

PhD Forensic Molecular Genetics, Expert in Forensic Science, Medical Legal Directorate, Training and Human Development Division, Ministry of Health, Baghdad / Iraq.
Corresponding Author Mobile: 00964 - 07901707159
Email: *geneticforensic[at]yahoo.com*
ahmed.mohammed[at]mizan.edu.iq

Abstract: ***Geologists they said that Iraq is like a floating ship on a sea of oil, but from another point of view, Iraq is a ship floating on a sea of mass graves. Routine techniques are often insufficient to address the identification of human remains in mass graves. The major complicating factors include commingling of skeletal remains, delayed exhumation, lack of ante - mortem information and attempts to conceal evidence of criminal activity. The identification of human remain is important for both legal and humanitarian reasons. Commingled recovered from mass graves are very common in Iraq therefore it was not possible to determine which individual they belonged to. It is the main challenging that face anthropologist in identification of human remains, so we are trying for awareness the importance of new technology to identification commingling human remains. Aims: Commingling of human remains is a common component of certain types of incidents, such as mass graves or mass disasters, and it is often the role of the forensic anthropologist to attempt to document and resolve commingling. Routine techniques are often insufficient to address the identification of human remains in mass graves. For some situations it may also be necessary for a forensic anthropologist to segregate non - human remains that are commingled with human remains. We draw attention to the identification the commingled human remains in mass graves according to modern protocol that approved from International Commission on Missing Person ICMP and United Nations of Human Rights UNHR Results: Cases in which forensic pathologist have too little data for identification by other means and in advanced stage of decomposition. DNA typing (with high number of STR Multiplex kit) and Mitochondrial DNA represents a potentially useful method in cases of commingled remains. Methods: Skeletal remains should be recovered and analyzed in an organized manner for the purpose of resolving commingling. The most appropriate technique (s) should be reliably and objectively applied for segregating remains and determining the number of individuals present. Tests should be documented in a manner conducive to the documentation, replication, and verification of the work performed. Forensic identification of human remains generally involves three main stages of investigation: 1) Background research 2) recovery of remains 3) Laboratory analysis, Robin and Morris, 2009. Methods to be employed to resolve commingling and estimate the number of individuals are divided into three general categories: Recovery, Sorting, and Number of Individuals. For each category, techniques will vary depending upon the remains available for examination and their overall condition. As the condition of the remains declines (e. g., fragmentation or poor preservation), the complexity of the recovery and/or analysis increases. The degree of commingling can vary widely from situations that are relatively straightforward (intact remains and a small number of individuals) to very challenging (large number of individuals and/or extensive fragmentation). The postmortem remains identification using standard methods including the matching of medical and dental records, the recognition of distinguishing characteristics such as the use of clothing and belongings, video superimposition, Ante - Mortem / Post - Mortem Data comprised, X - ray, Postmortem CT scan and DNA typing by somatic, Y and X chromosome STR loci (Luis, 2020)***

Keywords: Commingled remains, Anthropology, Bioarchaeology

1. Background

A mass grave is a grave containing multiple human corpses, which may or may not be identified prior to burial. The United Nations has defined a criminal mass grave as a burial site containing three or more victims of execution, although an exact definition is not unanimously agreed upon. (**Cox *et al*; 2008**). Mass graves are usually created after many people die or are killed, and there is a desire to bury the corpses quickly for sanitation concerns. Although mass graves can be used during major conflicts such as war and crime, in modern times they may be used after a famine, epidemic, or natural disaster. In disasters, mass graves are used for infection and disease control. In such cases, there is often a breakdown of the social infrastructure that would enable proper identification and disposal of individual bodies. (**Mant, 1987**).

Therefore, under no circumstances should the existence of a mass grave be denied or covered up, nor the site damaged or destroyed. Under no circumstances should those searching for or speaking of mass graves be imprisoned, threatened or silenced. Instead, a comprehensive human rights based approach must be taken. Figure 1 represent the mass graves discovery, Reporting and protection processes (**Angelinovic *et al*; 2005**).

There are a variety of forensic techniques in use today that can be applied to the identification of human remains. The choice depends upon the circumstances and the condition of the remains to be examined. Commonly used but not particularly reliable techniques include visual comparisons of special features, e. g. specific scars, tattoos, etc. Definitive techniques (fingerprint comparesons, dental comparisons) largely depend on the actual structural preservation, as well as the availability of premortem records (**Alonso *et al*.2001**). During times of acute social conflicts, major atrocities, mass disasters or terrorist attacks with multiple casualties, identification of remains in common burial sites becomes more complex and is hampered by a lack of pre - mortem data. Nowadays, these

complexities and the public expectations impose a burden on the application of DNA technology. In any particular mass disaster, there are many inter - related factors and circumstances that may challenge the final DNA identification goal. Those include, but are not limited to, the number of victims, the mechanism of destruction and the extent of the remains' fragmentation, the rate of degradation of the DNA, the accessibility of samples to be collected, and the availability of DNA reference samples (**Alonso *et al*; 2005**). Short sequences and a high degree of polymorphism make the short tandem repeats (STR) method practical and amenable to amplification by PCR. Information about the genetic diversity of the male - specific portion of the human Y - chromosome, especially the Ychromosomal short tandem repeats (Y - STRs), has grown considerably over the past decade. The Y - STRs have recently been established for routine casework in paternity testing, particularly in deficiency cases, as well as in forensic stain analysis (**Prinz *et al*; 1997**, **Shneider *et al*; 1998**). More than 14 Y - specific STR markers are known to provide simple, sensitive, reproducible and reliable markers for the identification of male individuals (**Kayser *et al*; 1997**).

As Saddam's evil regime collapsed in April, 2003, and his Baath Party mass murderers retreated into the shadows, Iraqis began to act on their formerly hidden grief. They searched for their loved ones rounded up over the years in campaigns of terror. They had heard rumors about shots in the night, mass burials, and vanished prisoners. Now they followed those bloody trails to the mounds of earth they suspected entombed their beloved children and parents. The new leaders in Al Hillah, Karbala, Najaf and a dozen other cities and towns around Iraq worked with U. S. and British forces to try and protect some of the mass graves (**Andrew *et al*; 2004**).270 mass graves have been reported. By mid - January, 2004, the number of confirmed sites climbed to fifty - three. Some graves hold a few dozen bodies—their arms lashed together and the bullet holes in the backs of skulls testimony to their execution.

Other graves go on for hundreds of meters, densely packed with thousands of bodies. The teams discovered just so far the remains of 400, 000 people in mass graves, The United Nations, the U. S. State Department, Amnesty International, and Human Rights Watch (HRW) all estimate that Saddam Hussein's regime murdered hundreds of thousands of innocent people. "Human Rights Watch estimates that as many as 290, 000 Iraqis have been 'disappeared' by the Iraqi government over the past two decades (**Andrew *et al*; 2004**).

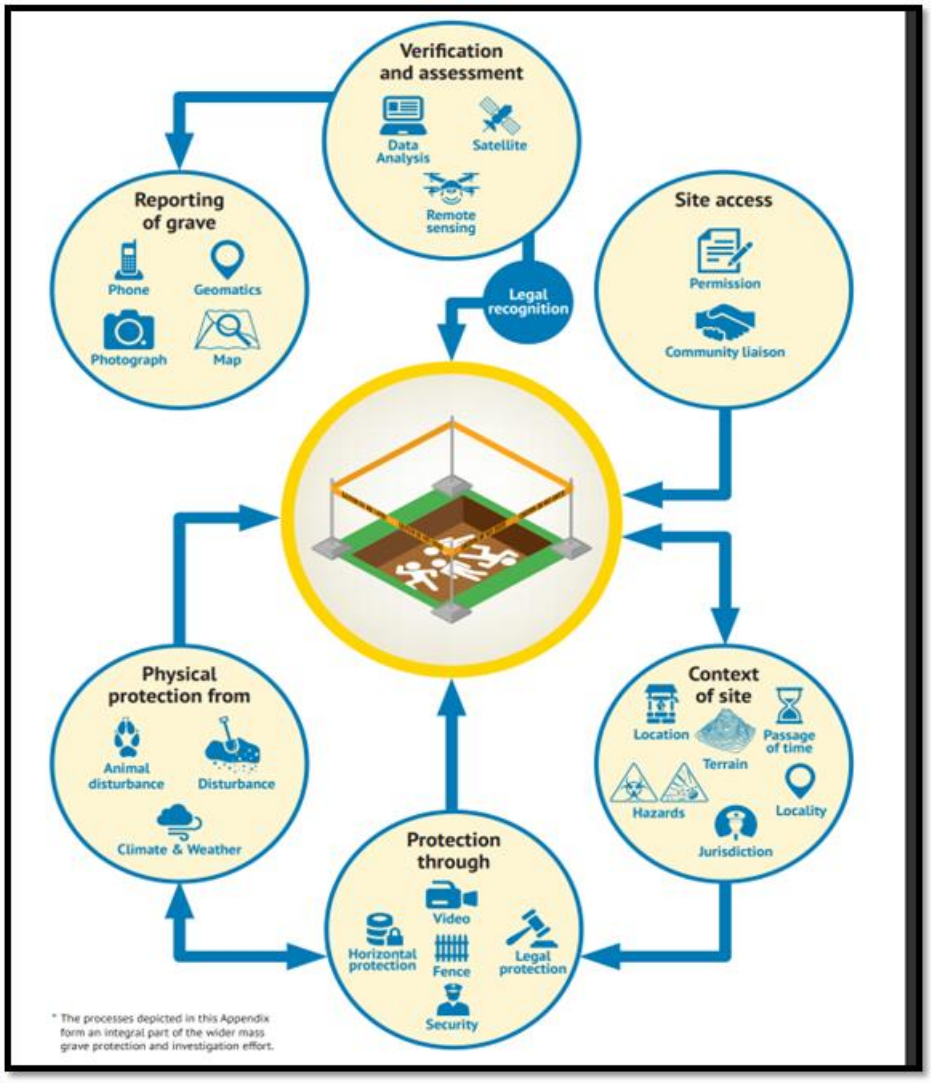
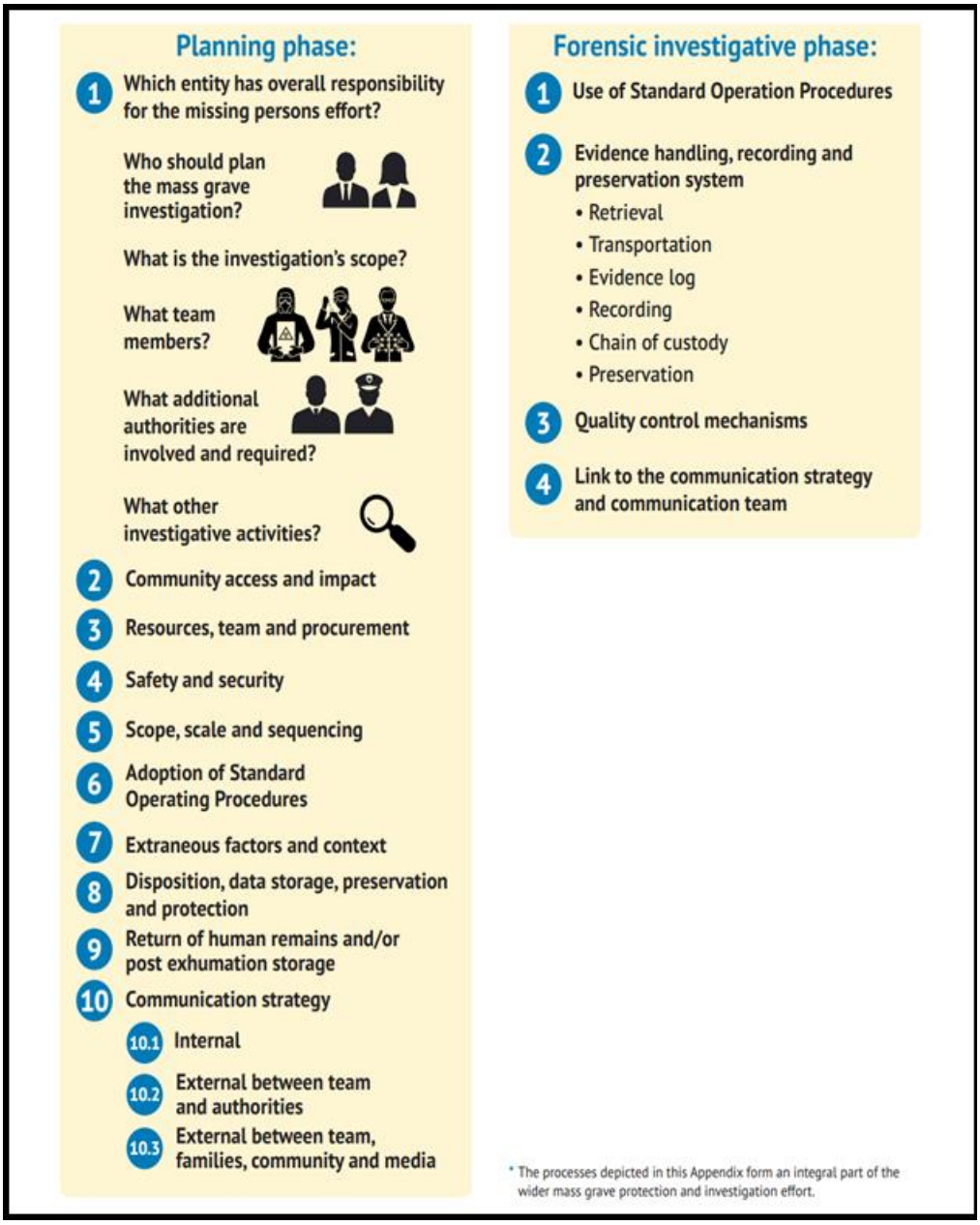


Figure 1: Mass Graves Discovery, Reporting and Protection (Melanie and Ellie, 2020)

Mass graves are an all too frequent legacy of conflict and gross human rights violations. For the survivors, the need to know the fate and whereabouts of loved ones, and to receive mortal remains for burial and/or dignified commemoration, can be overwhelming. Increasingly this need is being recognized as a legal right to know the truth. Mass graves contain evidence that is essential to the effective realizatio of truth, justice and perpetrator accountability. Effective rules and procedures for the protection, maintenance and investigation of mass graves are therefore vital. At present, however, while there are a number of best practice approaches in operation amongst various actors in the field, no universal, shared or common standards exist. Through a participative and consultative process, Figure 2 summery the modern investigation process of mass grave. It neither duplicates nor replaces existing documents on principles and good practice1. Instead it offers a unifying inter - and intra - disciplinary, approach to mass grave protection and investigation. It follows the chronology of these processes in their entirety with a multitude of stakeholders, disciplines and mechanisms coming together for the dual, and mutually reinforcing, purpose of advancing truth and justice (**Aurelija and Dario, 2022**).



2. Results

Victims in mass graves can be men, women and /or children. They can be civilian and /or armed combatants from either side of a conflict, there no such thing as a standard or typical mass grave investigation or exhumation, mass grave investigation are highly context - specific. This can be due to factors such as geographical and temporal jurisdiction as well as the political environment. The development of forensic science, including DNA analysis, has led to the possibility that families of missing people will not only be able to establish the fate of their missing relative, but also that any remains will be identified and returned to the families (**Skinner, 1987**). Before the advent of DNA analysis, forensic haemogenetics had been used as an element of human identification programmes, but the scope

of such analysis was limited. In recent years, the ability to recover and analyse minute amounts of deoxyribonucleic acid (DNA) from biological material has revolutionized forensic science (**Alonso *et al*; 2001**). Figure 3 summarized the identification efforts processes, since the first DNA profile was produced in 1984, the development of DNA analysis has been dramatic it has become more sensitive, more discriminating, less costly and faster. The same technology that allows samples recovered from a crime scene to be matched to a suspect can be used to match human remains to the biological relatives of missing individuals. DNA sampling adds significant power to the resolution of commingling of fragmented remains (**Alonso *et al*; 2005, Zlatko *et al;* 2010**).

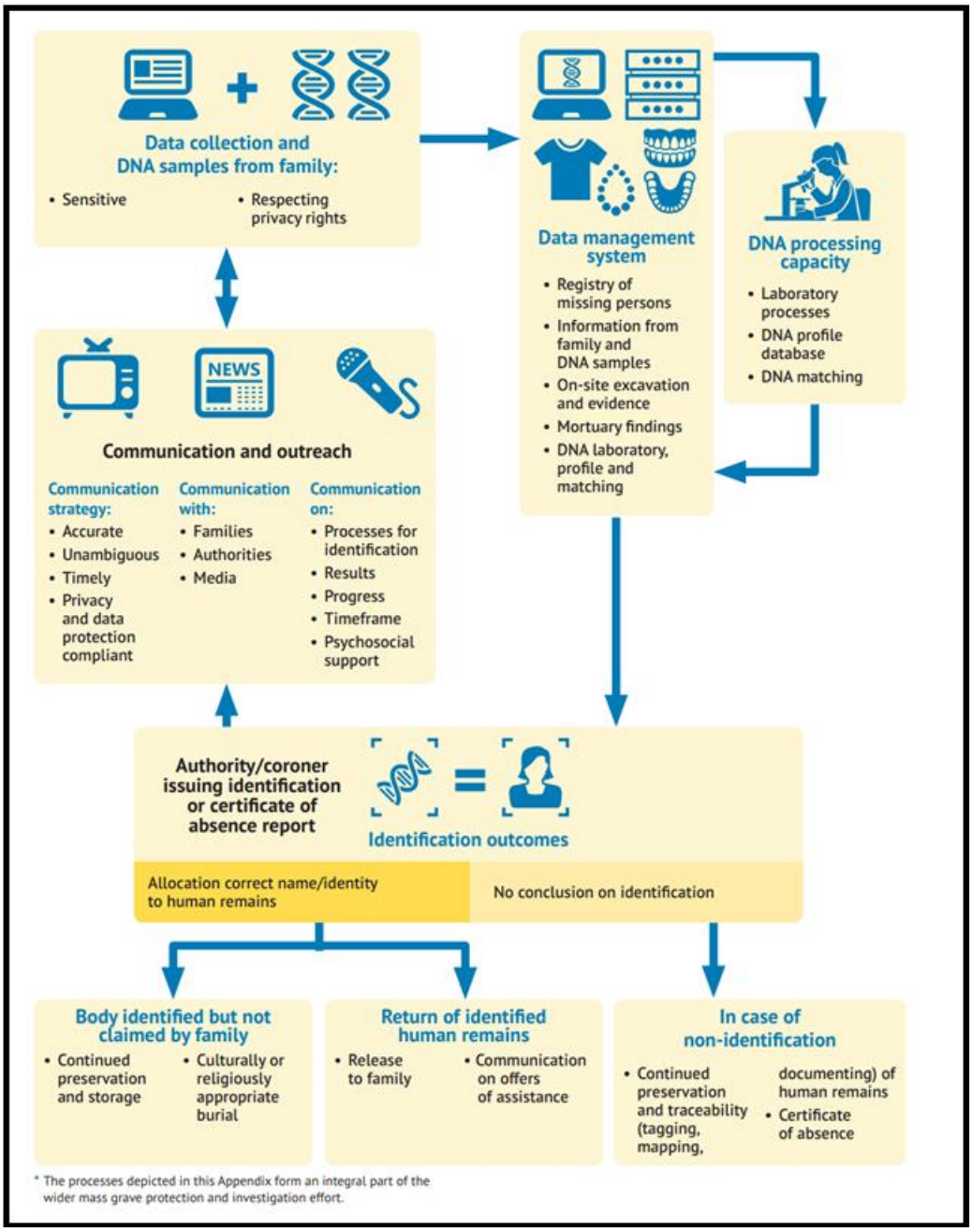


Figure 3: Identification Efforts Process (Melanie and Ellie, 2020).

3. Discussion

Mass graves are often a legacy of conflict and human rights abuses. As well as the need for survivors to know the truth about the fate of their loved ones and to receive their human remains to allow them to be buried and commemorated, there is a need to investigate and preserve mass grave evidence. To realise survivors' rights to truth and justice, an effective protection regime for the maintenance and investigation of mass graves is needed. Following conflict and gross human rights violations, victims have a right to know what happened to their loved ones and a right to justice. Across the world mass graves, often containing a multitude of human remains, are sites of human loss, suffering and unimaginable acts of cruelty. There are compelling reasons for why mass graves need to be protected. They hold evidence that is important for the criminal investigations needed to bring perpetrators to justice. At the same time, the families of the dead have a need and right to know what happened to their loved ones.

Figure 4 represent the truth, justice and commemoration processes of mass grave.

The importance of identifying victims from a war situation involves humanitarian as well as medical and legal concerns, establishing postmortem identity can be very difficult. When a missing person is believed to be dead, two complementary lines of investigation must be pursued tracing the whereabouts of that person once he or she has been reported missing by his or her family or other reliable sources forensic identification of human remains. The forensic identification of human remains is a legal determination (sealed by the jurisdictional authority's signature on a death certificate) based on the scientific matching of information on missing persons with unidentified human remains. Identification requires a holistic approach that takes into consideration all available scientific and contextual evidence. Each line of evidence must be weighed and treated on its merits.

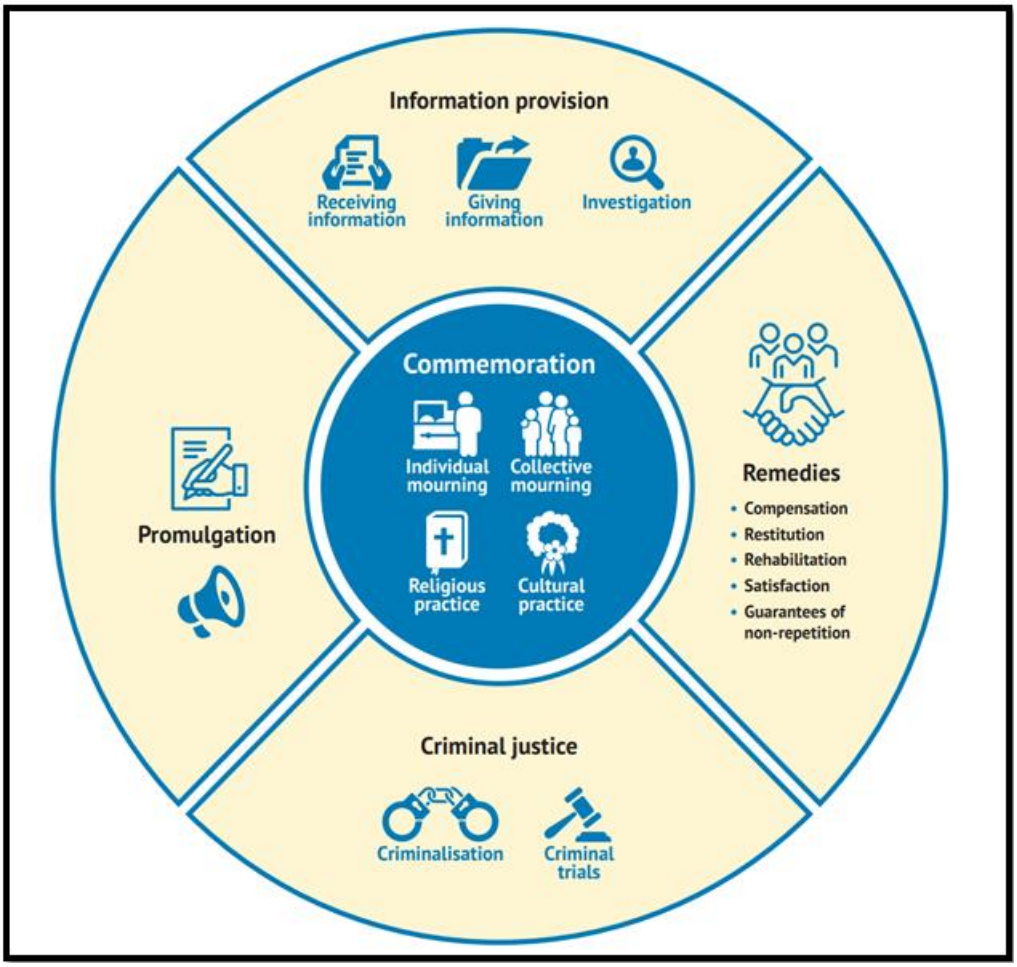


Figure 4: Truth, Justice and Commemoration processes of mass grave Melanie and Ellie (2020)

4. Conclusion

Commingling of bones and other body parts is a major obstacle to individual identification that must be addressed before other forensic determinations or research can proceed. Regardless of the cause for the commingling (transportation disaster, terrorist attack, natural disaster, genocide, etc.) it is critical that the proper experts are involved and that the proper techniques are employed to achieve the greatest success in making identifications. Resolution of commingling nearly always requires consideration of multiple lines of evidence that cross the disciplinary lines of modern forensic science. The use of archaeology, DNA, and forensic anthropology are several areas that are critical in this process and these are core topics presented in Commingled Human Remains.

5. Recommendation

We can conclude that definitive identification of human remains in situations of intentional disposal and concealment becomes impossible if one is to rely only on routine autopsy and anthropological techniques, although these remain an integral part of the process in the ever - expanding multidisciplinary endeavor which is strengthened by the advanced DNA technology. It is most important to use mitochondrial DNA (DNA Sequencing) for identification of commingled human remains is the main choice to save time, samples, cost and it is highly accurate.

List of abbreviations

International Commission on Missing Person ICMP
United Nations of Human Rights UNHR
Deoxyribonucleic acid DNA
Mitochondrial DNA mtDNA

Short Tandem Repeats STR
Mass Grave MS

Declarations
I certify that the information given is true and complete to the best of my knowledge. I understand that if I have deliberately given any false information or have withheld any information regarding any situation, I am liable for prosecution for fraud and/or perjury.

Ethics approval and consent to participate
This study was approved form scientific and ethical council in the Iraqi medical legal directorate (MLD) / Ministry of Health (MOH). This research was conducted based on Article 2 of the Iraqi Forensic Medicine Law of 2013.

Consent for publication
This review article was dependent on up to date systematic review articles in commingled remains and article was consent for publication conducted based on Article 2 of the Iraqi Forensic Medicine Law of 2013.

Availability of data and material
This depend on up to date data publication from International Commission on Missing Person ICMP and United Nations of Human Rights UNHR with many of global cases.

Competing interests
The author declare that they have no conflict of interest.

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Authors' contributions
The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

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Cover letter
Editor Name: Ahmed Kadhim Mohammed
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Aim of Article: Routine techniques are often insufficient to address the identification of human remains in mass graves, also we have huge number of mass graves in Iraq .
Why I considered in the journal: Yours Journal is official publication, is an open access journal that publishes articles in the forensic sciences, also Publishing with Open access makes your work freely available online for everyone, immediately upon publication, and our high - level peer - review and production processes guarantee the quality and reliability of the work. Author have agreed to the submission to the yours journal and that the manuscript is not currently under submission in any other journal

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