

An Outstanding Success Story of Genetic Relatedness Search that Helped Unravelling the Mystery Surrounding Decapitated Bodies found in a Cave at the Lebanese Syrian Border

Marc Obeid^{1*}, Lara Abou Jawdeh² and Issam Mansour¹

¹Analytical Testing Laboratories, Department of Laboratory Science and Technology, American University of Science and Technology, Beirut, Lebanon

²The Lebanese General Security Medical services, Beirut, Lebanon

*Corresponding author: Marc Obeid, Analytical Testing Laboratories, Department of Laboratory Science and Technology, American University of Science and Technology, Beirut, Lebanon, Tel: +9613396880; E-mail: obeidmark@gmail.com

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Abstract

After the onset of the Syrian war in 2011, the Islamic State of Iraq and Syria (ISIS) have invaded a significant area of the country including a rural area at the north-eastern Lebanese-Syrian borders. Since then, there were several trials of invasion into the Lebanese territories until August 2014 when the north-eastern Lebanese town of Arsal was briefly invaded. During this invasion, 18 Lebanese Army soldiers were held hostage by ISIS and kidnapped out of the country into a no-mans-land at the Lebanese-Syrian borders.

In parallel, since the onset of the Syrian war, thousands of Syrians have been kidnapped and reported missing. Many of these crimes were especially committed against ethnic and religious minorities such as the Syrian Yazidi and Syrian Christians (Figure 1). These human rights violations are occurring on daily basis and led to thousands of mass graves, each having its characteristics, its difficulties and its mysteries that increase with the continuing war and the increasing number of missing individuals. However, the primary focus is to dedicate all the available means to determine the identity of each victim in order to return the remains to their families, in accordance with the Geneva conventions.

Keywords: Endogamy; War crimes; Cadavers; Geneva convention; Consanguinity; STR analysis; DNA; ISIS

Introduction

This report presents an original identification process of skeletal remains from a cave on the Lebanese border using an original strategy of searching for genetic relatedness among the remains.

Background

In December 2016, the Lebanese General Security services carried out a mission on the north-eastern Lebanese-Syrian border next to the Lebanese town of Arsal and found unidentified skeletal remains in a cave of a mountainous area (Figure 2). All victims had suffered decapitation. In total, four bodies and four severed heads were found. The discovery prompted speculation that the remains belonged to four of the 18 Lebanese Army soldiers who were held hostage by ISIS in August 2014 when the town of Arsal was briefly invaded. Given that the Lebanese General Security was leading the negotiations for the soldiers' release, the agency took the bodies for investigation and delivered samples to our laboratory without prior anthropological investigations.

Materials and Methods

DNA profiles were obtained from at least one tooth of each head and a femoral bone from each body. Overall, 28 autosomal STR markers, in addition to Amelogenin, were studied using three kits:

PowerPlex 16 system (Promega, Madison, USA), PowerPlex ESI 17 Pro system (Promega, Madison, USA) and PowerPlex CS7 system (Promega, Madison, USA).

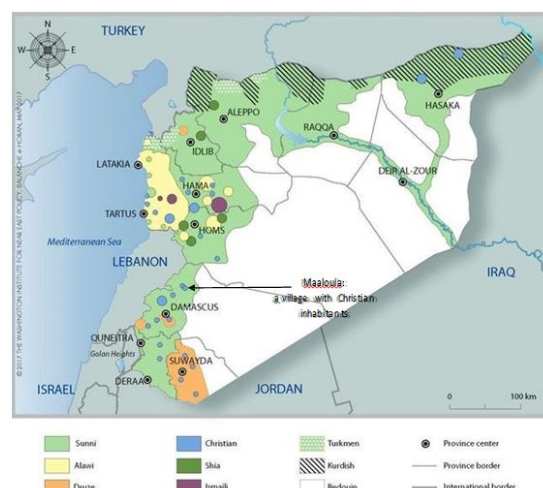


Figure 1: A map of the general distribution of religious communities in Syria, showing a relative seclusion of Minorities (Key information in the present case: Maaloula is a village with Christian inhabitants situated in an area with Sunni Muslim majority) [1].

Reactions were performed using the Gene Amp PCR system 9700 thermocycler (Applied Biosystems, Foster city, CA) and the ABI PRISM™ 3130 Genetic Analyser (Applied Biosystems, Foster city, CA).

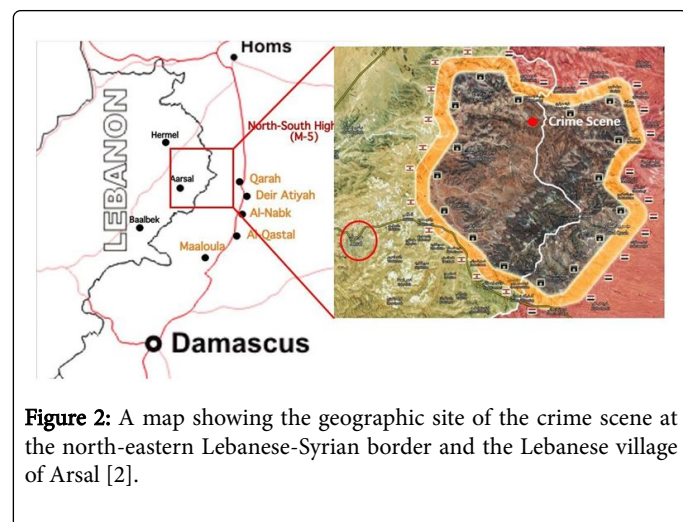


Figure 2: A map showing the geographic site of the crime scene at the north-eastern Lebanese-Syrian border and the Lebanese village of Aarsal [2].

Results and Discussion

First run of results

A. The first unusual finding was that three profiles matched between three heads and three bodies respectively, whereas a fourth profile was obtained from a head without its body, and a fifth profile from a body without its head. The latter head and body were alleged to belong to the same person since they were found concomitant at the crime scene and no other remains were found. DNA profiling proved that they belong to two different individuals. It was then concluded that the number of victims wasn't four but five.

B. These DNA profiles tested negative in kinship studies with parents of the 18 missing servicemen kidnapped by ISIS in August 2014; consequently, it was confirmed that the five found bodies did not belong to any of these soldiers.

This posed a new question – whom did the bodies belong to?

Answering the question was a massive challenge because from the time when the Syrian war have started in 2011, thousands of Syrians have been reported missing. In addition, data collection has been impossible due to ongoing fighting, chaos and population displacement. These factors made identifying these bodies even more challenging and families of missing individuals have had therefore to endure the suffering of waiting for information, very often to no avail.

Fortunately, the results of a separate on-going research project at our laboratory ultimately helped unveil the victims' identities within three weeks of profiles determination.

In brief, the research aimed at evaluating the kinship statistical uncertainties due to endogamous and consanguineous marriages [3], which are frequent practices in Lebanon and Syria, especially within geographically secluded religious minorities.

The study included a large dataset from several villages and covered all Lebanese regions and religious communities. Results showed that inhabitants of a given village with social/geographical seclusion showed genetic relatedness and positive siblingship tests among

socially unrelated individuals. Individuals with different family names and having no known social relations were tested positive. These individuals originate and live in the same village and belong to the same religious community. The observed genetic relatedness is most probably due to common ancestors and to a sustained practice of endogamy, encouraged by religious and cultural habits and by a geographic seclusion due to religious differences and long term ghettoization.

Second run of results

A. In reference to the above mentioned research findings, we tried a search of genetic relatedness using siblingship statistical assessment among the five unidentified victims and surprisingly found that victims were genetically related (Figure 3).

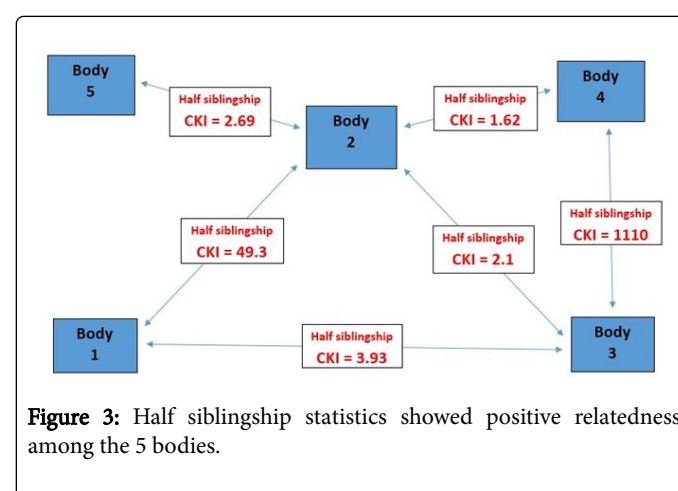


Figure 3: Half siblingship statistics showed positive relatedness among the 5 bodies.

This led to the conclusion that the victims could not have originated from distinct areas; consequently, they could not have been soldiers, or citizens kidnapped at ISIS checkpoints, but rather victims of a raid into a particular area/village [3].

This paved the way to search for individuals reported missing from the same family or the same village. Finding such information should usually be easy, but not in the case where the region is at war and hundreds of thousands of individuals were reported missing.

Accordingly, the search for the identities of these victims was oriented by the Lebanese General Security Forces to a large geographic area around the north-eastern Lebanese-Syrian border. This included the Syrian village of Maaloula, situated at 170 km from the crime scene (Figure 4) and which is inhabited by the Christian minority in Syria and from which several unrelated inhabitants were kidnapped in September 2013. Consequently, family members of the missing persons were asked to undergo DNA profiling in order to proceed for kinship statistical testing.

B. The DNA profiles of all five victims amazingly, tested positive in kinship studies with parents of missing persons in Maaloula.

C. It was next confirmed that all five identified victims belong to five different families, carry different family names and have no known social relations other than being inhabitants of the village Maaloula!

D. On April 25, 2017, the bodies were returned to their respective families.

The case was selected among Top Ten cases by the DNA Hit of the Year Award 2018, which is organized by Gordon Thomas Honeywell Governmental Affairs, USA.

The case was discussed and highlighted in the final presentation at the Human Identification Solutions (HIDS) Conference in Rome, Italy, May 3-4, 2018.

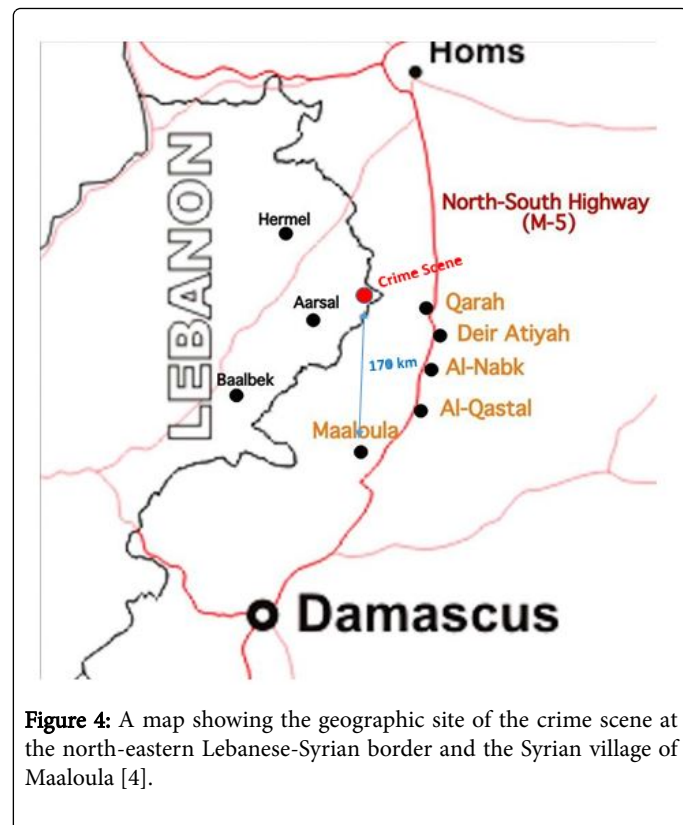


Figure 4: A map showing the geographic site of the crime scene at the north-eastern Lebanese-Syrian border and the Syrian village of Maaloula [4].

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