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Who knows who we are? Questioning DNA analysis in Disaster Victim Identification

Caroline Bennett, University of Kent, School of Anthropology and Conservation

Abstract

The use of DNA analysis as a mode of identification of disaster victims has become increasingly predominant to other, traditional, methods of identification in recent years. Scientific advances of the technological processes, high profile use in identification efforts across the globe (such as after 9/11 or in the Asian Tsunami of 2004), and its inclusion in popular media, have led to its popular adoption as one of the primary modes of identification in disaster scenarios, and to the expectation of its use in all cases by the lay public and media. It is increasingly argued to be integral to post-disaster management. However, depending on the circumstances, location, and type of disaster, this technology may not be appropriate, and its use may instead conflict with socio-political and cultural norms and structures of power. Using examples primarily from Cambodia and Iraq this article will explore what these conflicts may be, and in doing so, question the expanding assumption that DNA analysis is a universally appropriate intervention in disaster victim identification. It will argue instead, that its use may be a result of a desire for the political and social capital that this highly prestigious technological intervention offers rather than a solely humanitarian intervention on behalf of survivors and the dead.

Keywords: DNA; DVI; identification

Introduction

In recent years, DNA analysis has become more central in the identification of disaster victims. It is increasingly argued to be integral to post-disaster management (Montelius and Lindblom 2012) and the knock-on effect of high profile cases using the technology (such as 9/11, the Victorian bushfires in Australia, or the Asian Tsunami of 2004 for example) has led to a public expectation for the use of this technology in all identification efforts. The complex identification environments of disasters, which often present highly degraded, fragmentary and co-mingled remains (Zietkiewicz et al. 2012), means DNA analysis is often the

most successful mode of identification of human physical remains above other, more traditional methods, and its use in re-associating disassociated remains is without comparison as a mode of analysis: it offers both the most efficient and scientifically accurate mode of enabling this¹.

DNA analysis, whilst only one of a number of identification processes in the post-disaster environment (including odontology, osteological analysis and fingerprint analysis to name but a few) has become, in the lay, Western, imagination, synonymous with the word identification, and its use has come to reflect responsible, respectful, post-disaster management. However, in addition to not always being necessary, the use of DNA analysis to provide positive identification of human remains is a Western scientific and technological advancement, which, depending on the circumstances and location of the disaster, may not be appropriate. It may instead conflict with socio-cultural norms and structures of power. This article will explore what these conflicts may be, and in doing so, question the expanding assumption that DNA analysis is a universally appropriate tool in disaster victim identification. It will argue that its use may be a result of a desire for the political and social capital that this highly prestigious technological device offers, to individuals, organizations, and governments involved in its deployment.

Whilst the academic literature debates exactly what constitutes a disaster, practitioners have no such difficulty. The International Federation of the Red Cross (IFRC) defines a disaster as 'a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community's or society's ability to cope using its own resources' (International Federation of Red Cross and Red Crescent Societies 2013). It is this definition that this paper will use. Whether natural or of human origin, disasters are by definition catastrophic events that (even if only temporarily), cause social, economic and political chaos, often including mass death. Alongside care for survivors and re-establishment of basic services, management of the dead is viewed as one of the essential actions following a disaster (Tidball-Binz 2007); a crucial aspect of re-asserting control and order on a society and people thrown into chaos and disorder by the disaster event. In many (although by no means all) instances this includes the individual identification of the deceased, and repatriation of the remains.

¹ Before bone to blood DNA analysis became a relatively accessible technology in the early 2000s, disassociated remains were usually re-associated physically via the comparison of skeletal morphology. However, this can often lead to mistakes in association, something that was highlighted in the Balkans in particular: once DNA analysis became the standard mode of re-association there, some body parts were identified as belonging to particular bodies that had already been buried with those parts re-associated.

To date the academic literature has primarily treated disaster victim identification as a practical problem: a puzzle to be solved by different scientific techniques or with different modes of management, the relative success of which is analysed following the identification efforts (Beauthier et al. 2009; Hartman et al. 2011; Lessig et al. 2006; Montelius and Lindblom 2012; Zietkiewicz et al. 2012). Whilst disasters and their impacts (on survivors, the environment, the political systems, and the post-disaster operatives to name but a few) have been extensively covered in the literature², there is a paucity of coverage of the social impact of different modes of identification. Likewise, whilst DNA analysis has received much attention in the social sciences for its impact on notions of kinship (Finkler 2000; Finkler, Skrzynia and Evans 2003) or its implication in criminal cases (Guillén et al. 2000; Prainsack and Kitzberger 2009) amongst other topics, its use in the identification of human remains, either individually or in the case of mass death (not only in disasters but also in such cases as mass grave victims), has received scant attention. However, identification of human remains is a social and political act as well as a scientific and technological one, and should, therefore also be considered in such a light. Whilst management of the dead is necessary for both practical and social reasons, the post-disaster environment provides a complexity of socio-cultural and political circumstances that must also be taken into account, and the use of DNA analysis is one of the aspects that falls within this sphere.

The political power of DNA analysis: an ethnographic example³

In 2009, on the first day of our training on mass grave investigation in Iraq, a colleague presented an introduction to the use of DNA analysis for identification. As he began to talk about the statistical accuracy rate of bone-blood DNA analysis, a participant's hand shot up; he stood up and announced 'here in Iraq we say there is a 99.99% accuracy to our DNA analysis and we have a very high success rate!⁴

² The list of relevant literature is far too extensive to list here; examples include (Beyerlein and Sikkink 2008; Fothergill 2003; Oliver-Smith 1996; Petterson et al. 2006; Stadler 2006).

³ The ethnographic examples in this paper develop out of the author's own experience: in 2009 – 2010 working as a forensic anthropologist in Iraq on a project training people within the government how to undertake the identification of human remains, and in 2012 – 2013 conducting research in Cambodia on contemporary relationships to mass graves and those who died during the Khmer Rouge regime of 1975 – 1979. Both encounters involved much exploration of the use of DNA analysis for the identification of human remains, both those found in mass graves and those resulting from disaster situations.

⁴ In practical terms many factors contribute to the success or failure of making positive identification of human remains via DNA analysis: the presence of a reference sample; the type and condition of remains to be assessed; the time lapsed since the disaster, and other factors besides.

At the time morgues across Iraq contained thousands of unidentified bodies – since 2003, Baghdad morgue reports that it receives up to 800 fresh bodies per month from the ongoing conflict, most of which could not be identified (ICMP 2008). Instead they remained in storage at the back of the mortuary in old refrigeration trucks. The Medico-Legal Institute (MLI), which undertook most of the pathological investigations of death, had neither the facilities nor the expertise to enable DNA analysis of bone-blood, and at the time, the Iraqi government was not letting human biological material leave the country to be analysed elsewhere.

There was, in reality, no possibility of achieving accurate identification of human remains by DNA analysis in Iraq at that time⁵. Corpses were primarily identified by documents found on the body, or by visual recognition by family members. The rate of success was so low that some people resorted to having their ID tattooed on their bodies in the hope that, if killed, they could be correctly identified and returned to their families⁶. But this was irrelevant: what mattered was the reporting of a 99.99% accuracy rate for identification by DNA analysis, that was, according to this doctor, very successful.

Bodies are inherently political and, as Karen Verdery (2000, 2002) notes, our treatment of them reveals societal political ideologies and moral norms. The use of DNA analysis in the identification of human remains sits within the array of political tools open to manipulation, enabling the harnessing of their symbolic power, the accumulation of social and political capital for those involved in DNA analysis, and, through the handling of these factors, a means of exercising control over a population and acting in the global community. It was this symbolic power that our Iraqi colleague was exercising when he announced the success rate of their DNA program despite the blatant invalidity of the statement.

This is especially true after a disaster, when the social fabric of everyday life is ruptured; not only in the time and place where the event occurred, but in the case of disasters of human origin such as terrorist attacks, across the globe. Managing the dead is one of the aspects of post-disaster management that is crucial; not only (or indeed even) for the assumed 'closure' identification of the human remains will bring to the

⁵ In 2009 Iraq had few forensic specialists in any field. The British police force were providing training on crime scene investigation, and the International Commission on Missing Persons and International Committee of the Red Cross were providing training on forensic site management and identification of human remains. Facilities were limited: morgues were set up for rapid autopsy of fresh bodies; there were few storage facilities for body parts, and many mortuaries did not even own bone saws for removing sections of bone. There were no laboratories for doing bone-blood DNA analysis, nor any practitioners who knew how to undertake it. There were no facilities for managing the reference blood samples required, and no data systems for matching samples. Although both blood and bone samples could have been sent abroad for analysis, at this time the government refused to allow biological samples leave the country, offering, therefore, no possibility for identification by DNA analysis at that time.

⁶ Those who were tattooed usually had the tattoos done on the inside of the upper thigh, because this was the area least likely to be damaged if torture or other mutilation occurred.

survivors, but also for the harnessing of the symbolic power of the dead and their treatment. The individual identification of the dead is often assumed to be central to this process, and the use of DNA analysis a core aspect enabling this. However, to assume either of these things – individual identification or the use of DNA analysis – is always appropriate to the management of the dead should be questioned.

Why do we need to manage the dead? How can DNA analysis interfere with this?

Following a disaster the dead need managing for practical reasons: having bodies lying around rotting is both potentially mentally distressing for survivors and, although rare, can pose health risks to survivors if not properly disposed of⁷. In addition positive identification of the dead may be necessary for many other reasons: to establish those still missing, to identify perpetrators, to establish death for inheritance rights, access to bank accounts, pensions and other legal actions, for example.

However, in addition to these practical matters, management of the dead is also a social concern, something that may become overlooked in the chaotic post-disaster environment. Whilst the specific nuances of use or exact terminology vary in differing locales, most societies make a distinction between 'good' and 'bad' deaths, and between 'happy' and 'unhappy' dead⁸. In virtually all cases, the manifestation of happy or unhappy is based on two primary circumstances: the nature of the death event, and treatment after death: in general terms a calm death and appropriate post-death management results in happy dead and a violent death or death in bad circumstances, and/or inappropriate post-death treatment causes unhappy dead. In Cambodia, for example, the unhappy dead are those who have died unexpectedly, usually in tragic circumstances where neither they, nor their loved ones, were prepared: a car crash, a murder, or in a disaster for example.

Disasters, be they of human origin or natural, rupture the everyday life and cosmos of a particular time and place. By that definition, death by disaster is invariably bad: it is usually sudden and violent – lives are ripped from people, social cohesion is destroyed and chaos often (even if only temporarily) descends. One may

⁷ Whilst large numbers of dead bodies do not usually pose health risks (Tidball-Binz 2007), on occasions large numbers of corpses left untended have caused problems. In the years following the Khmer Rouge regime in Cambodia (1975 – 1979), mass graves were excavated as locals looted them for gold and other valuables. In most cases the bodies were piled up on the edges of graves and left there to decompose. This mostly caused no risk to health. However, in the wetland areas, such as around Choeung Ek, Phnom Penh, the decomposing remains leaked bodily fluids and bacteria into the water supply and disease began to spread amongst the local population.

⁸ The anthropological literature from around the world has covered these distinctions extensively, for more information readers are directed to discussions by authors such as: (Bovensiepen 2009; Bloch and Parry 1982; Chouléan 1988; Dernbach 2005; Formoso 1996; Perera 2001; Schwab 2010) to name but a few.

assume, therefore, that the dead of a disaster are unhappy dead. The unhappy dead are cause for much social disorder across the world; trapped in 'perpetual liminality' (van Gennep 1960 [1908]: 164) they are forced to endure ongoing, sometimes eternal, suffering. This suffering often causes them to interject into the lives of the living in quite disruptive ways. In Cambodia, where between one and three million people perished during the Khmer Rouge regime of 1975 – 1979⁹, the ghosts of the dead in some areas haunted the living until the re-establishment of the monks and religious rituals in the 80s brought them under the 'proper' control and enabled them to move to their next lives peacefully. In Vietnam, failure to properly enact funeral rites in My Lai and Ha My following a massacre by US soldiers during the US-Vietnamese conflict of the 1970s caused ongoing suffering and trauma for decades to the survivors because the dead could not rest properly (Kwon 2006). In many parts of Asia the unhappy dead are liable to become malevolent spirits who cause bad luck, illness and even sometimes death (Bertrand 2001; Formoso 1996). In some parts of Eastern Europe they may become vampires who prey on the living (duBoulay 1982). In many places in Euro-America they are apt to become haunting ghosts trapped on the human plane. In some cases the dead are lonely, in others hungry, in others vindictive and angry. The unhappy dead are unable to complete their cycle of existence; in the Christian world they cannot progress to heaven; in Buddhism and Hinduism they cannot progress to their next life; for many people they simply cannot rest. As Schwab (2010), in her examination of trans-generational trauma, notes:

the dead who were denied the rite of burial, who died an unnatural death, who committed or were the victim of a crime, or who suffered an unbearable injustice come back to haunt the living. (Schwab 2010: 78)

In being unable to complete their life cycle, the dead affect the social continuity of the world of the living, which in turn can lead to social unrest.

It is therefore imperative that, alongside practical concerns, the dead are quickly and correctly dealt with following death in order to maintain social stability and prevent the creation of unhappy dead. This is particularly important following mass death, such as in a disaster - a large number of dead exposes a place to the potential chaos of many restless dead in addition to the ruptures already effected on the living. Bodies

⁹ The exact number who died during this period is unknown, but most scholars estimate somewhere between one and three million, with around 1.5 – 2 million being a common reported figure (DCCam 2012; Hinton et al. 2005; Guillou 2013; Kiernan 2003). In 1998 Heuveline attempted to calculate a more accurate estimation through statistical analysis of all available demographic material, and produced a range of estimated death figures of 1.2 – 3.4 million people, with approximately 1.1 million of those being 'violent deaths' (Heuveline 1998: 56).

are dangerous - both physically and spiritually - and must, therefore, be controlled. Following a disaster one of the means of control is in their identification, for this is what determines who is ultimately responsible for them. As Wagner (2008: 255) states, 'identification reinserts the missing back into the embrace of the state'.

However, the assumption that this identification must be based on individual, positive identification of the physical remains and that Western modes of enabling this (such as DNA analysis) are appropriate has no empirical basis, but instead reflects an assumption that there is a universal response to mass death, and therefore universal and standard ways to deal with it (Summerfield 1999). All cultures have strict socio-cultural norms related to the management of the dead, and breaking these can cause further instability and social unrest. These norms vary between locales, and to assume a Western mode of management may cause conflicts, which can potentially lead to further unrest. In Israel, for example, the frequency of terror attacks on the population led to the establishment of volunteer groups known as Zaka, who following a disaster or other event, clear up all bodily remains, including blood and flesh pieces left over, in order to ensure a proper Jewish burial (Stadler, Ben-Ari and Mesterman 2005). When the formal forensic identification programme for the missing of the Ba'athist regime of Saddam Hussein began in Iraq, the government argued strongly for bodily integrity after identification, and tried to insist on all bone sections removed for DNA analysis being returned so they could be buried with the body (of course this is not possible – the bone is ground up during the analysis process). In parts of Micronesia to speak someone's name after death calls down their spirit and can therefore bring misfortune to the living (Dernbach 2005); in such a situation, how does forensic, individual identification of physical human remains - where the name must be spoken - affect the community? In most cultures strict taboos dictate appropriate food, social interactions and clothing to be used by those managing the dead and for the dead themselves, but in the post-disaster environment, few of these considerations can be taken into account.

Even the process of identification may conflict with socio-cultural norms and expectations. Part of the drive for many participants undertaking the training of nationals in Iraq that the author was involved in was that they believed that Muslim remains should only be handled by Muslim people. Whilst in some cases taking a sample for DNA analysis from human remains may be unobtrusive and simple (for example saliva or blood), due to the catastrophic nature of many disasters, samples taken for DVI often require the destruction of some (small) part of the body; the removal of soft tissue; the extraction of teeth; or the amputation of parts of bone from the skeleton (which may first require the removal of flesh from the body). In some world systems this equates to desecration of the dead and may cause significant stress to the surviving population. Consideration should also be taken as to what happens to the flesh that is removed. In some labs the flesh is

labelled and stored in separate containers so that it can be repatriated with the rest of the corpse once the remains have been identified, in others it is simply disposed of in communal waste disposal: what consequences does this have for people who require bodily integrity to be able to complete their life cycles successfully?

In addition, using DNA analysis in the identification of disaster victims assumes that it is the physical remains which hold the ultimate importance to the living, and that these must therefore be identified as early as possible and returned – ideally to their relatives, but in the very least, to their native countries. Once physically dead, the remains can be treated in whichever way best serves this purpose. However, not all cultures view death as instantaneous or directly related to the moment of biological death; instead it may be a process by which the spirit learns of its status; it is 'an extended transformative process' (Dernbach 2005: 100). In Cambodia, for example, lay ritual specialists work alongside Buddhist monks to allow the spirit to progress through its lives: in the seven days immediately after death the spirit does not know it has died, and is liable to return to its house and its family. In doing so it poses a risk to the living who remain there. A strict regime of rituals ensures the spirit cannot return to the body or the house during those seven days, and that on the seventh day the spirit will awaken to recognise its death and so move on to the next life. The physical presence of the corpse is, however, not necessary for these rituals to be enacted, and the dead may peacefully move to their next life without their remains ever being located. In addition, if the spirit has progressed to its next life, the use of DNA analysis to identify corporeal remains is unnecessary and may add nothing positive to the grieving process of the surviving relatives.

How then, given the local and global dimensions of a disaster, can the norms of a society be best respected to ensure peace to the living and the dead? Arguably the most important aspect of managing the post-disaster environment is the re-assertion of control and stability on a locale thrown into chaos, and the reality of the immediate post-disaster environment is that not all socio-cultural particularities can be respected; in most cases a pragmatic approach must be employed. Disasters are rarely entirely local events where local people deal with the remains of local people. Disasters occur within both local and global communities: not only are they likely to include victims from across the globe, but their management after the event will almost certainly be one which is undertaken by various actors, who may come from across the international community. The actors within this system include police, military, governments, NGOs, forensic professionals, trauma professionals, tourists, media professionals, and many more besides (Interpol 2009; Tidball-Binz 2007). This already difficult environment is further complicated by the fact that whilst the

management of any disaster rests with the state within which it occurs; the legal status of human remains usually depends upon the state from which they derive.

As external imaginings and concerns intersect with local practicalities and understandings, and outside organizations intervene in the post-disaster environment, appropriate management of the dead and culturally sensitive identification efforts may become compromised. A disaster, by definition, needs external intervention to help manage and re-assert calm and control, particularly when it occurs in a developing nation, as is often the case with natural disasters. These nations may have neither the expertise nor the logistical ability to successfully manage identification efforts, particularly complex, technologically advanced interventions such as identification by DNA analysis. External organizations may become involved simply to provide advice, or they may assume control, either of the entire post-disaster management or of aspects of it, such as the identification of human remains. This can lead to conflicts of understanding or practice, through a kind of technological ethno-centrism, where it is assumed that DNA analysis is the best or most appropriate mode of enabling identification. Whilst DNA analysis was technologically appropriate in Iraq, logistically it was untenable, for reasons highlighted earlier. That did not prevent its advancement by those wishing to exploit its prestige, as will be explored below.

DNA identification, authority and power

The use of DNA analysis in disaster victim identification is almost always presented in terms of humanitarian relief and human rights. London, Parker and Aronson (2013: 1178), for example, assert that following a disaster, forensic identification of the remains is necessary to ensure the welfare and human rights of those who survive, without questioning whether this is universally the case. The meteoric advancement of DNA analysis in recent years, combined with widely publicised successes of identification efforts across the world, and its inclusion in popular media and TV shows, has led to it becoming an expected technological intervention. DNA analysis has become almost synonymous with the word identification; in post-disaster management it has, I contend, become totemic¹⁰ of responsible, well-ordered and capable governments and societies; because of the 'extraordinary credibility' given to DNA analysis in the West (Lynch *et al.* 2008: 257), its use in victim identification is essentialised as both an appropriate and superior technological intervention.

¹⁰ Here I use totemic following Summerfield's (2001) use, referring to a concept which has become emblematic of a particular group of people or community: here morally and ethically responsible governments.

Not to use it is therefore irresponsible and uncaring. Enshrined in the post-enlightenment language of science and rationality, DNA analysis becomes symbolic of the morality and responsibility of those who use it:

ensconced in the language of 'hard' science, the DNA technology driving ... processes imparts an air of impartiality to counter claims of political gain or manipulation.... (Wagner 2008: 256)

The 'language of 'hard' science' as Wagner states, not only provides apparent impartiality; it also presents an element of authority to those who employ it. The value-laden terminology of reason and logic that exists within the scientific discourse of DNA analysis, and the 'awe and anxiety about the perceived power of DNA analysis' (Lynch *et al.* 2008: x), enable those employing it to assert control over bodies, and thus manipulate the social and political power they contain.

The management of symbolic bodies is hugely influential in power relations and modes of control, (a form of biopower to borrow Foucault's term), and a significant contributor to social capital (Bourdieu 1986) for both individuals and societies in general. Those who control the symbols, control the power (or vice versa) - the two are inextricably linked (Cohen 1974). Following a disaster, therefore, controlling the manipulable biopower of the dead is vital to those in authority to regain control and order, and to provide social and political capital to those involved in their management. By contrast, the disregard of the dead can cause loss of control or power, both real and imagined.

DNA analysis is, of course, also expensive, both economically and technically. To undertake accurate DNA analysis requires facilities and technical expertise that are hard to come by, and expensive to maintain. In some cases identification by DNA analysis is impossible. In others it may be inappropriate for both social and ethical reasons. But the use of this highly advanced technology is prestigious; both for the individuals involved in taking samples and doing the analysis, and for the agency that undertakes it, or orders it undertaken, or manages its use post-disaster. In many cases (as in the example at the start of this paper from Iraq) it does not really matter whether the technology is used or not, nor its actual success rate; the simple declaration of intention may be enough to both provide social capital and control a chaotic and demanding population. In declaring that Iraq intended to start forensic identification efforts by DNA analysis, the newly established government was able to harness the dead to distance themselves from the previous Ba'athist regime, who, under the leadership of Saddam Hussein, had caused these nameless dead, and from the insurgents who continued to kill people almost daily. In asserting that their DNA analysis was 'highly successful', our Iraqi colleague could associate his organisation, and by implication his government

(because it was a governmental institute), with the control and authority over the dead and their identity. In addition they could assert moral authority and 'heroism' to themselves by renaming the missing¹¹.

It is not just technology that is used this way; the bodies are too. Dead bodies are not inherently meaningful, but become hugely symbolic depending on cultural ascriptions related to death and the narrative into which the dead body is fitted, which depends on the particular aims of those providing the narrative (Verdery 2000: 28). Bodies differ in relative worth even within the same nation and the use of DNA analysis can emphasise this through the 'reinscri[ption of] socio-political and economic inequalities already in place' (Wagner 2008: 265). In her ethnography of DNA analysis in Srebrenica, Bosnia-Herzegovina, Wagner (2008) provides contrasting examples from 9/11 and Hurricane Katrina to illustrate this. The identification efforts for 9/11 began within one month, and a pledge was made that identification efforts would continue ad infinitum. In 2013 three new people were identified through the re-testing of remains using new procedures (NYC Office of Chief Medical Examiner 2014); funding will reportedly continue whenever new technologies of identification are developed. In contrast, following Hurricane Katrina, it took four months for the use of DNA analysis even to be agreed, and even then only \$13 million dollars was pledged to the effort. In international narratives, whilst the dead of 9/11 (many of whom were white-collar workers of prestigious international financial institutions) were hailed as heroes, the dead in New Orleans were simply poor (anonymous, black) people, and the respective value revealed in these narratives was reflected in the identification efforts used in either case.

All interventions have social impacts and we should be mindful as to what these might be beyond the identification effort. The reality of post-disaster management is that governments primarily offer assistance in order to recover their own dead and provide support to the victims of their own country. This can lead to increasingly difficult environments as experts from many nations attempt to recover and identify their dead. It can also lead to disproportionate care and attention being given to the dead from those nations who have identification teams as opposed to those that do not. Following the Asian tsunami of 2004, over 30 international DVI teams worked on identification efforts: teams from Austria, France, Germany, Sweden, the UK, Spain, Singapore, and many other nations, worked on recovering and identifying their own dead (Beauthier et al. 2009; Lessig et al. 2006). Each team had its own system of work, many of which conflicted with each other, causing many issues: conflicts caused delays in work, bodies were lost, and unequal treatment of the dead was manifested in plain view. Whilst identification efforts were pursued for Western

¹¹ Although training began in 2004, and the official, continual forensic programme of excavations began in 2009, there is yet to be a single positive identification of human remains in Iraq from these. The ICRC and ICMP continue their capacity building efforts in this area to date.

victims, after being photographed and tagged, the dead from Asia were rapidly buried in mass graves. They were identified by visual recognition of the photographs of the corpses by family and friends; a notoriously unreliable mode of identification, particularly in circumstances such as the tsunami where bodies may have been dramatically physically altered by environmental conditions such as long periods of time underwater, or exposure to the sun.

Scientific knowledge, as with any other knowledge, is the product of the specific socio-cultural and historical environment in which it was developed, it 'is a socially and culturally constructed enterprise, reflecting the themes of the society and culture of which it forms a part while concurrently imposing those themes on cultural conceptions' (Finkler 2000: 11). The assumed primacy of DNA analysis as a mode of producing positive identification of the dead after a disaster is no exception: it rests on a narrative deriving from Western, post-enlightenment discourse that holds that science is the ultimate provider of 'truth' and 'fact'. It also rests on the supposed association of identity with the physical remains for which DNA analysis is able to provide identification. In such a discourse, the human body could be argued to represent a form of shared understanding, a common feature of lived experience by which another human being represents ourselves in another form. In this scenario, a violence to a body - any body - represents a violence to ourselves, and death in a disaster, without individual identification, represents [what in this worldview is] the worst violence of all: the loss of individuality and therefore identity and dignity. In such circumstances, science should therefore be the most trusted means of producing and defending knowledge, particularly in such difficult circumstances as following a disaster.

Whilst academic circles have long debated these views, and simplistic notions of identity or behaviour being solely bound to the genes has been dispelled (see debates on epigenetics such as Carey 2012 and Spector 2012), the lay (Western) public and media still hold a largely essentialised notion of identity being primarily related to genetic information (Dar-Nimrod and Heine 2011) in which DNA provides the ultimate 'truth' of identity and is therefore viewed as a necessary part of any identification attempt. This relates to a misunderstanding of the apparent ease of use of this technology and success rate of DNA analysis, influenced by its inclusion in popular media as an evidential panacea for crime and misfortune¹². Whilst writers such as Lynch *et al.* (2008) have questioned the reality of the so-called 'CSI effect' (the notion that the media, particularly popular television shows such as *CSI: Crime Scene Investigation* have persuaded the public of the

¹² This is not only having an impact on DVI efforts, but also on the courtroom, where the use of DNA analysis, even when forensically unnecessary, has become expected in all crime scene investigations; whether appropriate or not (Lynch *et al.* 2008).

ease of forensic techniques), poorly communicated public information about molecular genetics from the scientific community (Commoner 2009) has led to an impression that DNA technology is both easily accessible, usable and infallible¹³. However, even in scenarios with the highest levels of political will, funding, expertise and facilities, identification by DNA analysis may not be possible: despite continually funded efforts and the highest levels of expertise and facilities, over 1,100 victims of 9/11 remain unidentified (NYC Office of Chief Medical Examiner 2014).

The use of identification by DNA analysis following a disaster makes several assumptions. It assumes a need for individual identification of the corporeal remains of the dead, and a primacy of biological and cellularly based information for this identification. It assumes that scientific knowledge and statistical accuracy is the most appropriate mode of enabling this identification. Bound up in Western discourses of trauma, healing and justice, which assumes a linear chronology to grief, and healing based on 'closure' via individual identification and repatriation of remains, it asserts that both individuals and societies endure ongoing suffering without appropriate management of the dead; often assumed to be the individual, positive, identification and subsequent repatriation of the remains. This supposed necessity of individual identification of corporeal remains is related to an assumption that people must be laid to rest in whatever way deemed culturally appropriate for both the living and the dead to be able to continue their existence. However, asserting a need for the identification of human remains for this suggests that this can only be accomplished in the presence of the body, thus inextricably linking personal identity to the corpse. In many societies, identity is neither biologically determined (by your DNA) nor linear (i.e. derived directly from your biological parents), and to assume it is could be regarded as thoughtless at best, as a form of ethno-centric bio-imperialism at worst.

In addition to these assumptions about the primacy of scientific-based, biological identification as the appropriate system of knowledge to apply post-disaster, there is an accompanying assumptive narrative of trauma and healing which asserts that a disaster environment is a site of trauma for both the individuals who experienced it, the nations in which it occurred, and, increasingly, the global networks within which it is

¹³ Whilst many people understand, if not the practicalities, certainly the complexity of DNA analysis, many assume it is a much more straight-forward and accessible technology. This is something I have come across time and time again in my work, and was illustrated very clearly in a discussion with my Cambodian research assistant in 2013 about the potential use (or not) of DNA analysis for the identification of human remains there. My assistant, a well-educated woman who had recently graduated from an international university where she had undertaken a number of scientific modules, commented that she thought it looked simple: 'you just put the bone on a scanner and then the computer shows a photograph of the person it belongs to'. Further discussion revealed that she believed there was a database – probably a governmental one - which had a photograph of each individual, and that forensic laboratories had a special scanner that 'read' the bone that sat on it and then matched it to the photograph. The only reason Cambodia did not have one, she thought, was because of poverty.

dealt with following the event. In this discourse the disaster, if not managed properly, will continue to have negative effects on all involved. Individual identification and repatriation of remains is essentialised as a necessary component of this: Interpol asserts that identification of remains is 'a basic human right' (Interpol 2009), although no international directives or regulations exist to this effect: the only international convention to deal directly with the treatment of the mass dead are the Geneva conventions, which are applicable only directly to bodies resulting from war or conflict¹⁴.

These assumptions are made within a discourse of painful memory¹⁵. Recent decades have seen an evolution of the terms 'trauma' and 'victim' from being limited and selective terms used in only extreme circumstances to being now seen as synonymous with human experience (Fassin and Rechtman 2009: 18). Increasing access and coverage of media is implicated in this rhetoric, particularly following a disaster, where an emphasis on grief and misfortune prevails. 'Western trauma discourse has come to shape the way experiences of violence are understood and communicated' (Summerfield 1999: 1451).

The assumption that disasters are individually and collectively traumatic, and that individuals and whole societies experiencing such events are automatically victims, 'scarred' both mentally and physically, is central to these discourses. The universal applicability and conceptual understanding of both victimhood and trauma is, however, contestable. Recent literature on the subject (for example Fassin 2008; Fassin and d'Halluin 2007; Fassin and Rechtman 2009; Rechtman 2000; Rechtman 2006; Summerfield 1999; Summerfield 2001) argues that these concepts evolved in the particular socio-historic circumstances of the past century, within histories of hierarchy and inequality, where changing presentations and understandings of historical events, personal experience, individual responsibility, and common humanity, altered the applications and common understandings of these terms. Summerfield (1999: 1449, 2001) argues that they reflect a 'globalisation of Western cultural trends towards the medicalisation of distress' in recent decades, where, alongside the rise in the understanding of trauma as a mode of common experience uniting humankind, the concept of victimhood has changed from being a comment on individual character (something experienced only by weak individuals who are to blame for that which happened to them), to

¹⁴ Many organizations have published guidelines to identifying the dead following a disaster (such as the Association of Chief Police Officers in the UK, Interpol, the International Committee of the Red Cross, the Pan American Health Organization, the US National Institute of Justice and many others), however, although generally similar to one another, all have slight variations.

¹⁵ The exploration of painful memory has been a recent fascination for many anthropologists working in areas where conflict, violence, human rights abuses, or disaster have occurred (Das, Kleinman and Lock 1997; Das *et al.* 2000; Das *et al.* 2001).

being a statement on the difficulties of human life. To be a victim, particularly of wide-scale disaster, is now used to indicate the blameless state of someone who is a sufferer of, or witnesses to, horror (McKinney 2007), and 'a 'culture of victimhood' has emerged within Western Society in which admission to one or another victim group confers psychological and moral advantages' (Bracken *et al.* 1997: 436)¹⁶. Contemporaneously, the meaning of trauma has transformed, from being a physical wound, to representing a tragic event (and therefore both external and collective) that will automatically leave negative psychological marks on those who experience it (Caruth 1995).

Alongside these changes, the term Post-traumatic Stress Disorder (PTSD) has become virtually synonymous with survival in cases of public violence and disaster: the diagnosis of PTSD is now used as an emblem of invisible, ongoing damage to the social fabric (Summerfield 2001)¹⁷. Following 9/11, for example, 10% of US citizens were diagnosed with PTSD. Most of those diagnosed had only watched the events on TV and knew no-one involved (Marshall and Galea 2004).

The transformation and normalisation of these terms and diagnoses, and their adoption as emblems of a particular type of experience, has had particular impact on the way disasters are viewed and managed: implicit in post-disaster management are moral and ethical judgments about those involved, and the narratives into which they fit, dictates the victims' treatment in death, including the use of DNA analysis as a means of identification. However, these views illustrate a particularly Western view of these concepts, and, as with the assumptions related to the primacy of scientific knowledge as a means of engaging with the world, they should be examined carefully before being applied outside the Euro-American zone, where, some have argued, they can become a form of Western domination (Summerfield 2001).

Conclusion

Social management after a disaster is complex. Managing an increasingly globalised event whilst remaining respectful of all involved is almost impossible. People cope as best they can, and the use of DNA analysis in identification efforts is often an essential component in this. But rather than simply accepting its use as

¹⁶ For more in-depth explorations on this, the reader is directed to studies by Fassin and Rechtman (2009), Rechtman (2000) and Summerfield (1999, 2001).

¹⁷ This is illustrated by studies such as Breslau (2000) on globalised discourses of suffering in Japan following the Kobe earthquake of 1995, where a scarcity of PTSD diagnoses were argued by psychological professionals to indicate a psychologically immature culture rather than a difference in cultural understandings and applications of psychiatry, and DeJong *et al.* (2000) whose study of adults in Freetown, Sierra Leone, diagnosed an astonishing 99% of their sample of 245 randomly selected adults to have PTSD.

necessary and desirable, we should be mindful of the wider social impact this technology can have beyond the post-disaster environment and question the assumption that it is invariably appropriate.

Identities are complexly intertwined presentations of biological, cultural and social systems, and how these systems of knowledge interact, and the impact of the choice of one system of knowledge over another beyond the act of identification is little understood or discussed. The use of DNA analysis in DVI begs questions of place and authority.

Whilst the Western media and lay population have come to view DNA analysis as the ultimate provider of 'truth' with regards to identity, this belief resides in a Western, scientific understanding of where identity is located and how it relates to the physical remains of each individual. However, different cultures may have different notions of identity: ones that are not biologically based, or do not derive directly from the parents, or where the physical remains of the individual are of relative unimportance following death. Disasters rarely happen in one locality, and are usually global in both impact and imaginings. Managing the multi-layered needs and desires of all the stakeholders is difficult, and pragmatics must prevail. However, even in such cases, care and attention should be paid to appropriate modes of treating the body and handling the dead. The use of such a highly advanced technological intervention as DNA analysis is, in reality, not always needed in the identification of disaster victims. That which is undertaken under the auspices of being 'for the common good', or being the 'right' mode of approach, often functions in a much more pragmatic way (be it in post-disaster or other identification scenarios); it is harnessed as a political tool and a means of gaining social and cultural capital by those involved, from the individuals conducting the analysis, to organisations managing its implementation, to governments funding it. The intervention of external agencies that determine the 'correct' approach to post-disaster management should be questioned. We should also question the place of the 'expert', because those who we consider expert in our world may be very far from such in a different time and place.

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