

Can digging up 100-year-old bodies help crack unsolved murders?

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Credit: Wikimedia Commons

Imagine the untold misery caused by telling the wrong family that their loved one is dead while another family is left in blissful ignorance. That's why accurately identifying bodies is of paramount importance.

Identification is usually based on simple criteria. Visual recognition or distinctive tattoos are often enough. But as time passes and the [body](#) deteriorates, these methods become less reliable or impossible. This will

certainly be the case for the bodies alleged to be those of Russia's Crown Prince Alexei and Grand Duchess Maria, which are [due to be re-examined](#) in an attempt to determine if they are the real royals killed during the Russian Revolution.

Forensic analysis has developed apace in the last century, and DNA technology in particular has opened ways of analysing bodies that were previously unthought of even relatively recently. Such technology is increasingly being applied to cases from the past, and the media are always [quick to report stories](#) where high profile mysteries are finally "solved" using modern forensics. The cynic would note that some cases (I'm particularly thinking of the "Jack the Ripper" murders) have been "definitively solved" several times with [different outcomes](#).

DNA evidence

So what can [forensic science](#) actually bring to these old cases? Certainly DNA can often be extracted from the body, often in teeth and bones. But a DNA profile isn't just a printout of who someone is. It has to be compared to a known profile. It's unlikely that we still have a hairbrush or toothbrush from Crown Prince Alexei, but if we have a known sample of DNA from a relation (such a bloodstains on a uniform from his great-grandfather Emperor Alexander II) then familial similarities [can be used](#)

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Our knowledge of DNA can do more than just identify someone. An old DNA sample can spot any [genetic diseases](#) a subject may have been prone to. Similarly, advances in technology allow us to look at the [chemical composition](#) of bones and determine what kinds of things they ate and so where in the world they probably came from.

Analysis of pollen from the sinuses can tell us about what plants were around the person. Carbon dating may tell us how old someone actually

is, although – as with most forensic techniques – only a range of dates can be given rather than a definitive answer. All of this information can help us work out whose body is (or isn't) being examined.

But we also shouldn't forget the simpler techniques. Just looking at a body may yield information depending on how well it has been preserved. Old or perimortem (from the time of death) injuries or bone deformities may be apparent. The shape of the skull and teeth may point to gender and ethnicity. CT scanning can show us inside the body without having to open it, helpful when dissection, which is an invasive and destructive process, is [not an option](#).

This battery of tests can tell us an awful lot about how someone lived, how they died, and who they may have been. The most publicised example of this in the UK was the discovery of King Richard III, which was identified by my colleagues at Leicester University last year.

It's not just the body itself that the forensic investigators can examine. If someone is buried, what is the grave like – deep or shallow? What does the soil tell us? If the body is in a shroud, how was that made and of what? The possibilities are only limited by the imagination of the investigators.

Unsolved mysteries

But before we get carried away, we must bear in mind that few things in this field are completely certain. By way of example, you'd think that attempts to carbon date the [Shroud of Turin](#) – the cloth claimed to have covered Jesus's dead body – would allow us to finally decide whether or not it really dates to Biblical times. But when the results came out suggesting not, an [argument arose](#) as to whether the sample tested was from the original weave or part of a medieval repair.

As time passes, the possibility of deterioration, contamination, alteration or outright fraud of a sample increases. The more people who handle a body, the more foreign DNA can be introduced. Time changes the body and changes the environment.

Finally, there is always the issue of interpretation. For example, was Palestinian leader Yasser Arafat [poisoned with radiation](#) or not? Different interpretations of the test results can lead to different conclusions. It was originally suggested that Arafat had been poisoned by 210 Polonium, and an exhumation of his body [produced samples](#) showing unusually high levels of this element, but [later analysis](#) suggested that this was environmental in nature.

So can modern forensic science reveal secrets from the past? Yes, but not necessarily as definitively as excited headlines may wish us to believe.

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