“Dentists were able to identify approximately 95 percent of the British tsunami victims from their teeth”

An interview with forensic dentist specialist Professor David K. Whittaker, UK

David K. Whittaker is Emeritus Professor of Forensic Dentistry at Cardiff University, Wales. He is the author of a standard text on forensic dentistry in the UK ("Colour Atlas of Forensic Dentistry", Wolfe Medical Publications) and the author of more than 100 publications. As a practising expert witness for 50 years, he has written more than 450 reports and statements and regularly appears in Crown, Appeal, Magistrates and Coroner Courts. Over this period, he has built up a service to the police, home office pathologists, lawyers and forensic scientists. In his role as an expert witness he acts for both the scientists. In his role as an expert witness he acts for both the

When you have a dead body to deal with and you do not know anything about it, you start by collecting all that information. In my opinion, it is best to do that first, even if you already have a set of dental records or a set of x-rays the police have produced from somewhere thinking it could be this person. It is better to ignore all of this information, put it aside, seal it in an envelope and even say to the police “do not give it to me” so you are not trying to fit what you see in the mouth to some dental record. It's the other way around. You are trying to describe what the person's mouth and face look like. It's not just the teeth you are looking at. It's also the shape of the face and lips. Dentists are trained not just to look at teeth but to look at palates, tongues and the mouth in general, the shape of the jaws, the growth, etc. All of this is part of their professional training. So you sit down with a blank pad, as if you were going to write a detective novel. You start with a name and no knowledge whatsoever. And then you start building up little bits of information.

You will look at the body as a whole, if you got a whole body, and firstly determine whether this is male or female. Even if it is decomposing or just a skeleton you can usually determine if it is male or female because of the pelvis, but even from the shape of the skull. For example, most men surprisingly have a forehead that slopes backwards a bit. Most women have one which is vertical. Men's jaws tend to be much squarer and they tend to flare at the back. Also, the big bones under the ear, called the mastoid that has muscles attached to it, is usually bigger and more marked in male bodies. I am going on, but there is quite a lot of differences. It is usually not very difficult to determine if the body you are looking at is male or female. That way you are not wasting your time looking for the wrong sex.

Then you start to look at the age of the person when they died. As I said in my lecture, you can do that because the teeth actually start to develop when you are still in the womb—only six weeks after conception. The human foetus is only a centimetre and a half long and his teeth are beginning to form. By the age of about 2 1/2, all the baby teeth will have erupted into the mouth. Then there is a kind of plateau, nothing seems to be happening, but in fact the permanent teeth, which also already started to develop in the womb, come through when the child is about 6 years old, and they go on erupting through to the age of 21. These are approximate figures. So from six weeks after conception to 21 years of age you can look at these teeth developing, either under the microscope or on x-rays or by just looking in the mouth. It is a sequential pattern you can work out how old they were when they died.

If we have to make some assumptions. So the real problem is the determination of the age after 21 years of age when everything sort of shuts down. We usually do that by taking one tooth out of the body and slicing it under a machine, usually lengthwise, and we put that under a microscope and measure certain changes on the root of the tooth. The older you get, the root of the tooth becomes transparent, because the mineral that deposits in it makes it transparent. This transparency starts to develop around the age of 25 and it spreads through the root until the bone takes over. So we can measure the extent of that and we can work out how long it has been going on and, therefore, how old the person is.

The examination of mummies showed that you can go back in time as long as you want to reconstruct the teeth and to figure out what sex the person had.

Well, it depends to some extent on how the person has been preserved since death. Most of the Egyptian mummies were preserved in different ways depending on which century they are from and, therefore, the methods of mummification were slightly different. We do not know a lot about the effect it has on the teeth, but we think that some of these changes happened in these mummies so we can use them in the same sort of way. We have to be a bit careful about that because we can't go back and check it scientifically, so we have to make some assumptions. But it works quite well.

And in a "regular" case, when a dead person is, let's say, left on a field?

Then we do know that some changes are occurring all the time, particularly when the body has been subjected to very poor conditions of preservation like a very acidic environment. We have tried to investigate these changes but there are very complicated transport systems for these amino-acids to the teeth. It can only handle left-handed ones, so all our teeth become as if they were left-handed. And then, as a result of this imbalance, the amino-acids start to rotate inside your teeth until, if you lived long enough, half of them would be left-handed and half of them would be right-handed and then they would cycle around after. So we take out the teeth of the dead body, remove the amino-acids in the laboratory and analyse for left- and right-handedness.

How long does it take them to turn?

Well, it actually takes hundreds of years, but in fifty years a small percentage of them will have rotated and our method is accurate enough to pick out that percentage. So we can determine how long it has been going on and, therefore, how old the person is.

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Clinical Case Studies

out bodies to find out what happened to them. People like me see a lot of dead bodies—I mean I’ve seen hundreds and hundreds. Each one of them is somewhat unique and you cannot assure that one change won’t necessarily occur in another and vice versa, so you have to try to compromise.

What have been the most interesting and challenging criminal cases you have worked on?

It is difficult to say because some of them are very interesting from a social and legal point of view. Some of them are very interesting because the situation is very unusual and some because they are very challenging scientifically and set new problems. So it is almost impossible to pick one. In terms of murder, the biggest one I have worked on was the Frederick West and Rosemary West murders in Gloucester in 1994, sometimes also called the Cromwell Street murders. Back then, I had to set up a special laboratory to deal with that because of security reasons and because of the amount of work. I worked more or lessad hoc for one year most of the day and sometimes most of the night on that case and almost nothing else.

What made it so difficult?

The sheer number of cases and dead bodies. We were dealing with a serial killer and a lot of female victims. They were all fairly young and we had no idea who they were. You can read about the Cromwell Street murders, there have been at least three books written about it.

How do you personally deal with what you see and hear in your job?

Well, this may sound very hard and cruel, but it doesn’t bother me at all. I switch it off. I think people use terms like Chinese walls. It is very important to see it this way because one cannot do the job properly if you get emotionally involved. It sounds terrible, but I view a dead person not as a person really, but rather as an object that I need to do my tests on and find the information that is needed. The most difficult part of crime for me is actually meeting the relatives, because it personalizes it too much. I try to avoid that as much as possible, but in some cases it is necessary.

So I can come home and, I think, switch off completely. Now my psychiatric consultant friends tell me that nobody can actually do that easily and eventually it will sort of get to you. Maybe it also got to me and I am not aware of it [laughs], but this is not to say that I am not sympathetic of course. When you say this, people see you being sort of hard and unemotional. I am just as emotional about death as any-body else is when it is my family etc, but not when it is a job that I was asked to do.

The rise of ethnic conflicts in the 1990s has resulted in a need for the identification of victims of ethnic cleansing or mass killings. What makes these cases different from the ones you have to face in everyday crime?

Those can be very difficult because you may have no dental records. And even if you did know roughly who the victim was, they may have never had any dentistry because we may be talking about a country where it wasn’t easy to get or they may have been younger people who didn’t need dentistry done, etc. In these cases you have to use a variety of different methods, work together with experts from different fields, like anthropologists, document experts, clothing experts, etc. So you usually have a team of experts working together on these cases. This is true for the 2004 tsunami victims for example. I managed the antemortem information to help identification of the British victims. There were lots of British Forensic dentists involved on Bo tas mainly in Thailand, and I can’t say too much about it because it has not been published. But what I can say is that we were able to identify approximately 95 percent of the British tsunami victims from their teeth, not from DNA or clothing, but from the teeth.

DNA identification methods have become more important in the recent years. Do you think that this will have an impact on the field of forensic dentistry?

It already has. Many people, myself included, actually thought that this would do us out of the job in the long run. DNA identification was discovered in Britain by the geneticist Prof. Jeffreys in the 1980s, and so we are pretty advanced on DNA technology in the UK. We are now able to pick it up from low copy numbers at very, very low levels. And of course the teeth can tell DNA. In my lab we do quite a bit of work on extracting this and looking at it, so actually DNA identification is part of forensic dentistry. Plus, DNA from teeth is pretty good, because it is well protected and not contaminated. And even then, in something like the tsunami, as I mentioned before, the victims were identified through their teeth and not their DNA. As you see, we still rely on forensic dentistry quite a bit.

Is there something a general practitioner/dentist can do to make your work easier?

The keeping of full and accurate dental records including x-rays and study models, and making these available to people like myself is the best help all.

Thank you very much for taking the time to sit down with me for this interesting interview!

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How do you normally work on criminal cases only, or are cases like the mentioned above also common in your everyday praxis?

I work on both, but the majority of cases are criminal cases like murder and rape and grievous bodily harms (GBH) cases. These are cases were the victim survives, but has been badly injured. Those are the three main types of cases that I work on.

In the UK we have the adversarial system of law. When a person is arrested, the crown prose-