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The Identity Of Cadavers Revealed By Their Teeth

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Researchers from the University of Granada have shown that a person's dental patterns can be used as proof of their identity with the same degree of reliability as DNA testing, the method that forensic police use to reveal the identity of dead bodies. The researchers came to their conclusion after analyzing the dental patterns of more than 3,000 people.

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"There is sufficient dental diversity between people to enable a scientifically-based human identification method to be developed for forensic purposes", Stella Martín de las Heras, lead author of the study and a professor of Legal and Forensic Medicine at the University of Granada (UGR), tells SINC.

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In order to reach this conclusion, the researcher and her team carried out a statistical analysis of 3,166 full and partial sets of teeth taken from the databases in the three most recent National Surveys of Oral Health (1993, 2000 and 2005).

Using these data, the team estimated "conditioned dental diversity", eliminating cases where people had all their teeth "present and healthy" or people who were "edentulous" (without a single tooth in their mouth), as these were of no use for identification purposes.

The results of the study, published in the journal *Forensic Science International*, show variability values of 0.999 (on a scale of 0 to 1), "which is comparable to the rates for a scientifically-based identification method such as mitochondrial DNA", stresses Martín de las Heras.

However, the scientist does acknowledge the limitations of using dental patterns: "Dental characteristics have low stability within the population compared with mitochondrial DNA sequences, which are only affected by mutations and heteroplasmy (different types within the same mitochondria, cell or individual)".

The dental patterns of a population depend on oral health status and, therefore, on age (decay is a cumulative disease) and the therapeutic dental approach of the time. At present, we are in a restorative phase (where teeth are restored) as opposed to extractive (when teeth are removed), as they were previously.

"But by analysing the data bases of dental patterns in Spanish populations according to different age groups and birth cohorts, we found test results with high homogeneity for all the databases, which shows the value of this system for identifying people, and its forensic utility", says the researcher.

Comparing teeth before and after death

In this procedure, an oral autopsy makes it possible to obtain a cadaver's dental data. To do this, forensic scientists use a range of techniques depending upon the body's state of preservation. In some cases they have to remove the maxillary bones in order to find details that cannot be identified in any other way.

The post mortem dental pattern is compared with the dental data of the person in life, information that is provided by dentists, although it can also come from doctors and family members. Various IT programmes are used to help in comparison and identification.

Aside from this finding, the team has developed a piece of software to identify bite marks. This tool makes it possible to superimpose, precisely and in 3D, the mark left by a bite over the tooth arrangement of a possible suspect.

References:

Stella Martín-de-las-Heras, Aurora Valenzuela, Juan de Dios Luna y Manuel Bravo. "The utility of dental patterns in forensic dentistry". *Forensic Science International*