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EDITORIAL ARTICLE

Forensic dentistry: In constant evolution[☆]

Odontología forense: en evolución constante

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Once we were blobs in the sea, and then fishes, and then lizards and rats and then monkeys, and hundreds of things in between. This hand was once a fin, this hand once had claws! In my human mouth I have the pointy teeth of a wolf and the chisel teeth of a rabbit and the grinding teeth of a cow! Our blood is as salty as the sea we used to live in! When we're frightened, the hair on our skin stands up, just like it did when we had fur. We are history! Everything we've ever been on the way to becoming us, we still are.

–Terry Pratchett, A Hat Full of Sky

Dentistry, as a forensic science, uses knowledge of the maxillofacial region to resolve legal problems, making it possible to identify living or deceased individuals in conditions in which conventional methods do not yield results. Because of their special characteristics, teeth are ideal for identifying individuals, both living and dead, and also for anthropological, paleoanthropological and population studies.^{1–4}

The first written account of the use of dental knowledge to identify a body is taken by scientists to be the “*Naturalis Historia*” by Cassius Dio, a Roman writer who in the year 49 Bc describes how Agrippina the Younger identified the remains of Lolita Paulina by her gold dental restorations.⁵

Since then, several instances where dentistry was used for identification purposes have been documented: Charles “the bold”, Duke of Valois, General Joseph Warren, Prince Napoléon Eugène Louis Jean Joseph Bonaparte, Dr George Parkman, the victims of the Bazar de la Charité, including Duchess Sophie Charlotte in Bavaria and John Hamilton, an associate of John Dillinger, among many others.

However, it was not until 1946 that dentistry was recognised as a forensic science in its own right by the First Pan American Congress of Legal Medicine, Forensic Odontology and Criminology held in Havana.^{2–4}

Since then, the progress made in developing dental techniques used in forensic sciences and criminology has continued unabated.

The main methods used in dental identification are the comparison of *ante mortem*–*post mortem* dental records, the development of *post mortem* dental profiles and dental DNA techniques. These are standardised, validated techniques based on the uniqueness of individual orofacial structures.^{2–4}

Dental restorations in general, and prostheses in particular, can provide a large amount of information, and a study of the clinical history and complementary tests (conventional

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X-rays, tomographies, photographs, models, etc.), in other words, the *ante mortem* "record", is fundamental.^{6,7}

The main limitations of forensic dentistry are probably the absence of standardised universally accepted procedures that take into account the idiosyncrasies of different legal and linguistic systems and country-specific dental record abbreviations, as well as the absence of *ante mortem* databases for dental comparisons.^{8,9}

Each professional has their own method of collecting dental data for their clinical records, so these records have to be standardised before they can be studied and analysed. In an effort to prevent forensic identification errors, the American Board of Forensic Odontology (ABFO) devised a protocol for collecting dental data from cadavers for identification purposes.¹⁰

Standardised procedures are also in place for collecting or recording *ante mortem* and *post mortem* data in the forms used by various national and international organisations, such as the International Criminal Police Organisation (INTERPOL) or the Spanish national law enforcement organisations (Guardia Civil [Civil Guard], National Police Force, Autonomous Police Force, etc.).

The introduction of computerised dental identification systems has been a major leap forward in forensic dentistry, and today several such programmes are available. The most widely known and used are CAMPI®, WinID®, D.A.V.ID® and Plass Data DVI-System International® (recommended by INTERPOL), which, among other applications, can be used for *ante mortem*–*post mortem* comparison of dental records. Other programmes, such as ADCM®, ADIS®, Odontosearch® and Dental System Architecture®,¹⁰ have been designed exclusively for dental identification.

Last, but not least, the latest, more specific systems, such as DIP3® Forensic Dental Symbols®, IDIS® or Dentyfy.Me® (dental records), IRS® (dental implant recognition), Dental Print® or Bite Print® (bite marks), or PRCS® (palatoscopy) have marked a turning point in forensic dentistry.¹⁰

Just 70 years after gaining recognition as a forensic science, forensic dentistry continues to evolve with the emergence of new techniques: dental DNA, spectrophotometric measurements of tooth colour for age determination, state-of-the-art identification of dental prostheses, the latest intraoral scanners to capture optical dental impressions, or the study of the oral microbiota to extract forensic data.^{11–13}

Eppur si muove.

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