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Dentalna identifikacija endodontskim radiogramima: prikaz slučaja

Dental Identification Through Endodontic Radiographic Records: a Case Report

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Sažetak

Svrha rada: Željelo se izvijestiti o uspješnoj identifikaciji humanih ostataka na osnovi usporedbe arhivskih, dakle prijesmrtnih (AM) podataka i poslijesmrtnih (PM) endodontskih radiograma. Zbog toga je u tekstu istaknuto koliko je važno spremati i čuvati dokumente u kliničkim arhivima. **Prikaz slučaja:** Nakon prometne nesreće dovezeno je neidentificirano tijelo. Odmah je obavljeno forenzično ispitivanje kako bi se ustanovio identitet stradale osobe. Kako u nacionalnoj bazi podataka nije bilo otisaka prstiju, u potrazi za prijesmrtnom (AM) dokumentacijom korišteni su radiogrami privatnih klinika dentalne medicine. Na kraju je poginula osoba identificirana na temelju analize obavljenih endodontskih terapija. **Zaključak:** Zubni radiogrami važni su kao pravno sredstvo koje podupire zahtjeve forenzičara u svakodnevnoj forenzičnoj praksi. U endodonciji su pak periapikalni radiogrami nezamjenjivi pri odgovarajućoj terapiji. U forenzici su ti radiogrami solidan izvor prijesmrtnih (antemortem – AM) podataka potrebnih za identifikaciju.

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Ključne riječi

forenzična stomatologija; forenzična antropologija; stomatološka radiografija; autopsija; zubni karton

Uvod

Diljem svijeta neprestano se povećava broj zahtjeva u sudskim parnicama. Zbog toga je vrlo važno odgovarajuće dokumentirati kliničke postupke (1). Kad je riječ o dentalnoj medicini, potrebno je arhivirati detaljni plan terapije, karton s podacima o provedenim postupcima i rezultate terapije kako bi se postigla zaštita od mogućih pravnih postupaka i etičkih primjedbi (2).

Dokumentiranje postupaka u dentalnoj medicini omogućuje i primjenu komparativne tehnike u slučaju identifikacije ljudi (3,4). Zato je vrlo važno arhivirati kliničke podatke jer mogu biti potrebni stručnjacima i civilnog i kriminalističkog područja forenzike. U tom kontekstu endodoncija je specijalistička grana dentalne medicine koja ovisi o radiološ-

Introduction

Currently, an increased trend of lawsuits is observed worldwide. Consequently, the correct registration of clinical procedures becomes more important over time (1). In odontology a detailed description of the treatment plan, practical steps and post-treatment outcomes is essential to support the dentist against potential legal and ethical complaints (2). Moreover, the registration of dental treatment also allows for further comparative techniques in human identification cases (3,4). To sum up, the registered clinical data play an important part both in the civil and criminal areas of the forensic environment.

In this context, endodontics is a specific branch of odontology, which essentially depends on imaging exams (5).

kim nalazima (5). Radiogrami zuba najčešći su izvor prijesmrtnih (antemortem – AM) podataka potrebnih za identifikaciju ljudi (6). Naime, ti se podatci mogu usporediti s poslijesmrtima (postmortem – PM) (7,8). Usporedna identifikacija ljudskih tijela obično se temelji na forenzičnim dokazima, poput obavljenih terapija zuba i jedinstvene morfologije (5).

Temeljem navedenoga, ovaj rad izvještava o identifikaciji ljudskog tijela usporedbom AM i PM endodontskih punjenja te se ističe koliko je endodoncija važan i prijeko potreban dio forenzične znanosti.

Prikaz slučaja

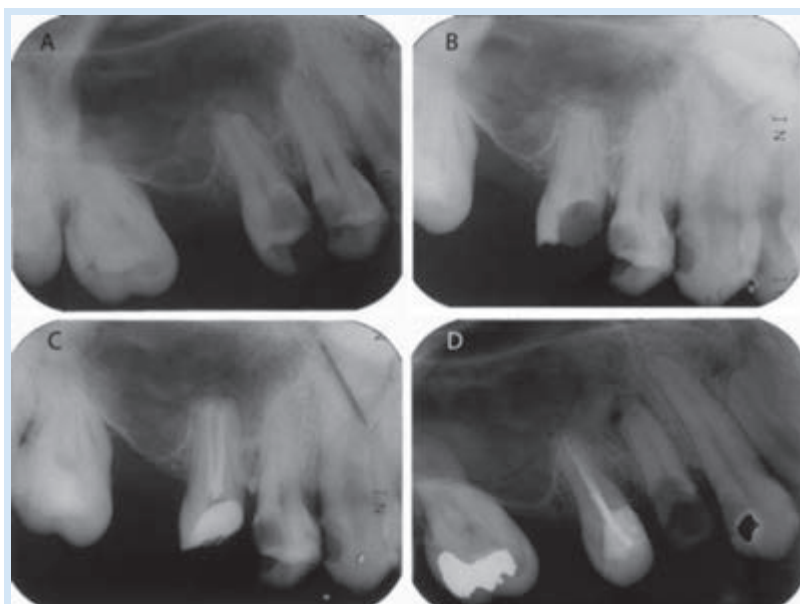
Nepoznato ljudsko tijelo nađeno je 2005. godine na mjestu gdje se dogodila prometna nesreća te je prevezeno u Patološki institut Medicinskog fakulteta u Goji, u Brazilu. Truplo je ondje bilo 30 dana kako bi ga preuzela rodbina. No nitko nije došao pa je ta poginula osoba pokopana kao nepoznata. U lijes su položeni i prikupljeni poslijesmrti (PM) podatci radi eventualne naknadne identifikacije.

Dental radiographs are the most common source of ante-mortem (AM) evidence for human identification (6). Once the AM data is obtained, the comparison with post-mortem (PM) data is enabled (7,8). The comparative human identification is usually based on forensic evidence, such as dental treatments and unique morphology (5).

Based on that, the present study reports a case of human identification through the comparison between AM and PM endodontic findings, highlighting the relevance of endodontics as an essential adjunct to the forensic sciences.

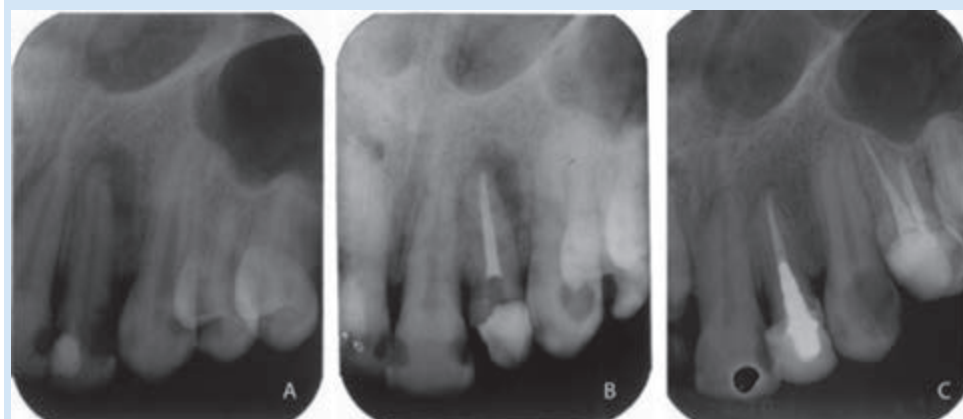
Case report

In 2005, an unknown body, recovered from a traffic accident site, was referred to the Medico-Legal Institute of Goiania, Brazil. The body awaited in the institute for 30 days allowing the relatives to claim it. The relatives did not come forward, and the body was buried as an unknown person. Nevertheless, the PM data of the victim was properly registered for possible human identification needs.



Slika 1. Usporedba antemortem (A: 2001, B: 2004 i C: 2004) i postmortem (D: 2006) periapikalnih radiograma – vidi se endodontsko liječenje desnog drugog maksilarnog pretkutnjaka (15), pneumatizacija desnog maksilarnog sinusa u području kutnjaka i nedostatak desnog maksilarnog prvog kutnjaka (16).

Figure 1 Comparison of ante-mortem (A: 2001, B: 2004 and C: 2004) and post-mortem (D: 2006) periapical radiographs, highlighting the endodontic treatment of the maxillary right second pre-molar (#15); the pneumatization of the right maxillary sinus in the molar region; and the missing maxillary right first molar (#16).



Slika 2. Usporedba antemortem (A: 2001 i B: 2004) i postmortem (C: 2006) periapikalnih radiograma – vidi se endodontsko liječenje lijevog bočnog maksilarnog sjekutića (22).

Figure 2 Comparison of ante-mortem (A: 2001 and B: 2004) and post-mortem (C: 2006) periapical radiographs, highlighting the endodontic treatment of the maxillary left lateral incisor (#22).

Potencijalna rodbina žrtve pojavila se 2006. godine pa je obavljena ekshumacija ostataka. Identifikacija otiskom prstiju nije bila moguća jer ih nije bilo u policijskoj bazi podataka. Zbog toga je odlučeno da se kod žrtve potraže osobni podatci o prijašnjim medicinskim i dentalnomedicinskim zahvatima. Rodbina je nabavila prijesmrtni (AM) dokumente u privatnoj klinici dentalne medicine, a sastojali su se od periapikalnih radiograma snimljenih od 2001. do 2004. godine u sklopu endodontskih terapija na drugom desnom maksilarnom pretkutnjaku (15) (slika 1) i lijevom bočnom maksilarnom sjekutiću (22) (slika 2.). Periapikalni radiogrami pokazali su i obostranu pneumatizaciju maksilarnih sinusa u području kutnjaka te ekstrakciju prvoga desnog maksilarnog kutnjaka (16). Na temelju tih dokaza učinjeni su poslijesmrtne (PM) radiogrami i uspoređeni s prijesmrtnim (AM) podacima. Isti forenzični dokazi nađeni su i na AM i na PM radiogramima, što je rezultiralo pozitivnom identifikacijom žrtve.

Rasprava

Radiogrami zuba smatraju se najpouzdanijim prijesmrtnim (AM) podacima u humanoj identifikaciji (6). Naime, ti radiogrami omogućuju blisko preklapanje i uspoređivanje poslijesmrtne (PM) i prijesmrtne (AM) podataka, što rezultira optimalnom usporedbom. Još se mora istaknuti da se endodontska punjenja rjeđe i teže modificiraju nego što je to slučaj s postupcima na zubnim krunama, pa se endodontski dokazi dulje mogu koristiti kao forenzično sredstvo (6). Osim toga endodontski materijal stabilan je i do 1100 Celzijevih stupnjeva, što omogućuje postupak humane identifikacije (10). Bonavilla i suradnici potvrdili su 2008. godine da se mikroskopska struktura korijenskih cemenata i gutaperke ne mijenja nakon što su izloženi visokim temperaturama (11). Praktičnu korist endodontskih podataka u identifikaciji ljudi opisali su već 1990. godine Spyropoulos i Liakakoy (12). Ti su autori obavili pozitivnu identifikaciju zuba na temelju endodontskih zahvata i morfoloških obilježja pojedinačnih drugih desnih maksilarnih pretkutnjaka. Wiesman i njegovi kolege istaknuli su 1996. godine pouzdanost prijesmrtne (AM) endodontskih podataka kao forenzičnog sredstva pri uspješnoj humanoj identifikaciji zuba (13). U ovdje opisanom slučaju ističe se koliko je pravno važno dokumentirati i čuvati podatke o kliničkim postupcima radi eventualne identifikacije stradalih osoba na temelju endodontskih terapijskih zahvata. Endodonti moraju biti svjesni primijenjenih tehnika, kad je riječ o optimalnoj radiografskoj procjeni zuba, jer omogućuju izradu poslijesmrtne (PM) radiograma te usporedbom omogućuju komparativni postupak pri identifikaciji.

Zaključak

Unatoč stalnom napretku dentalnih tehnika, materijala i opreme, standardni radiogrami kojima se liječnici koriste u kliničkoj praksi i dalje su najčešći izvor forenzičnih prijesmrtne (AM) podataka u slučaju identifikacije ljudi. Zbog toga endodontija postaje vrlo vrijedna specijalnost, posebice

In 2006, six months after the burial, potential relatives of the victim claimed the body, and the exhumation and human identification were performed. The fingerprint identification was not feasible due to the absence of AM fingerprint data, making necessary the search for personal data from previous medical and dental treatments of the victim. The relatives provided dental AM data collected from a private dental clinic. The data consisted of periapical radiographs, dated from 2001 and 2004, related to the endodontic treatment of the maxillary right second pre-molar (#15) (Figure 1); and the maxillary left lateral incisor (#22) (Figure 2). Moreover, the periapical radiographs revealed bilateral pneumatization of the maxillary sinuses in the molar region, and the absence of the maxillary right first molar (#16). Based on that, the PM data was obtained performing periapical radiographs of teeth highlighted AM. The same forensic evidence was detected both AM and PM, resulting in a positive dental identification.

Discussion

Dental radiographs are considered the most reliable source of AM data in the human identification field (6). Specifically, dental radiographs allow for a close PM duplication of AM evidence, consequently enabling an optimal comparative procedure. Additionally, root canal treatments are less modified in the clinical routine if compared to dental interventions performed on the dental crown. Thus, endodontic identifiers are maintained for a longer period as forensic tools (6).

In special situations, such as major fire disasters, the dental structures become fragile (9). However, endodontic filling materials remain preserved up to 1100° Celsius, allowing for human identification processes (10). Accordingly, Bonavilla et al (11), 2008, confirmed the preservation of microscopic structural patterns of root sealers and gutta percha exposed to high temperatures.

The practical usefulness of endodontic evidence for human identification was already described by Spyropoulos and Liakakoy (12) in 1990. The authors achieved a positive dental identification based on the endodontic treatment and morphologic outline of a single maxillary right second premolar. In 1996, Wiesman (13) corroborated the reliability of AM endodontic records as a forensic tool performing a successful dental human identification. Nowadays, the present study highlights the legal importance of storing and updating clinical records which allow for a positive dental identification based on endodontic treatment. Endodontists must be aware of the proper techniques for optimal radiographic dental assessment, making feasible a PM radiographic duplication for the comparative human identification process.

Conclusion

Despite the constant enhancement of dental techniques, materials and facilities, the conventional radiographs, routinely performed in the clinical practice, are still the most common source of forensic AM data for the human identification process. In this context, endodontics becomes a

zbog forenzičnih razloga jer se radiografije obavljaju u sklopu liječenja. Opisani slučaj pokazuje koliko je važan klinički arhiv s dokumentima o obavljenim zahvatima, a posebice radiogrami jer omogućuju uspješnu identifikaciju ljudskih ostataka na osnovi endodontskih podataka.

valuable specialty in the forensic scope, once periapical radiographs are often performed. The present case report illustrates the relevance of properly recording clinical interventions, through dental radiographs, providing a successful case of positive dental human identification based on endodontic findings.

Abstract

Objective of work: The present study aims to report a case of successful human identification based on the comparison of ante-mortem and post-mortem records of endodontic treatment. Based on these, the legal value of storing and updating clinical records is highlighted throughout the text. **Case report:** An unknown body was recovered from a traffic accident site. Forensic examination was conducted in order to establish the identity of the victim. Based on the absence of ante-mortem fingerprint registration in the national database, the search for AM data was performed using periapical radiographic records from private dental clinics. A positive dental identification was achieved analyzing evidence of endodontic treatment. **Conclusion:** Dental radiographs play a valuable role as legal tools supporting the criminal demands on the daily forensic practice. Specifically in endodontics, periapical radiographs are essential for a proper treatment. In forensics, these radiographs represent a solid source of ante-mortem data for human identifications.

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Key words

Forensic Dentistry; Forensic Anthropology; Dental Radiography; Autopsy; Dental Records.

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