p-ISSN 2337-6368 | e-ISSN 2615-4439
https://jurnal.ugj.ac.id/index.php/HERMENEUTIKA

LEGAL STUDY OF FORENSIC ODONTOLOGY FOR IDENTIFICATION OF NATURAL DISASTER VICTIMS FROM THE PERSPECTIVE OF LEGAL UTILITY

Whildy Audhia Rifdah[1], Endang Sutrisno[2], Sri Primawati Indraswari[3]
[1] Health Dental Care and Megu Medical Centre, Indonesia
[2 3] Master of Laws Program, Swadaya Gunung Jati University, Indonesia
Email : whildyar@gmail.com

DOI: https://doi.org/10.33603/hermeneutika.v10i1.11317
Diterima: 07 Desember 2025.; Direvisi: 11 Januari 2026..; Dipublikasikan: 06 Februari 2026

Abstract. *Identification of disaster victims is a crucial part of post-disaster management to ensure the rights of victims and their families to identity certainty are fulfilled. As a disaster-prone country, Indonesia requires an effective identification system that meets international standards. Forensic odontology is one of the primary identification methods recognized by Interpol due to its high level of reliability, especially when the victim's body has suffered extreme damage such as burning, decomposition, or cannot be visually identified. However, several disaster cases in Indonesia demonstrate that the use of forensic odontology is suboptimal and inadequately documented. This study aims to analyze the regulatory aspects governing the role of forensic odontology in disaster victim identification and evaluate its legal benefits. Furthermore, this study examines legal norms related to the preparation and use of universal odontograms as an important instrument in the dental-based identification process. The research method uses a doctrinal legal approach with a legal positivism paradigm and is analyzed using Jeremy Bentham's utilitarian theory to assess the extent to which legal benefits can be realized through the application of forensic odontology. The study results indicate that Indonesia has a strong legal basis for mandatory victim identification, but its implementation is hampered by limited expert resources, minimal awareness among law enforcement officials, and the absence of a uniform national odontogram system. In conclusion, the legal benefits of forensic odontology in disaster victim identification have not been optimally achieved, necessitating regulatory reform, increased institutional capacity, and strengthening of the national dental medical records system.*

Keywords: forensic odontology, victim identification, DVI, legal utility, odontogram.

A. INTRODUCTION

Indonesia is geographically an archipelagic nation located in the Pacific Ring of Fire, an area known for its high seismic and volcanic activity. This geological location makes Indonesia vulnerable to various natural disasters, such as earthquakes, tsunamis, volcanic eruptions, liquefaction, flash floods, and landslides. Furthermore, the development of urbanization, industrialization, and the growth of modern transportation increase the potential for non-natural disasters such as mass fires, industrial accidents, and large-scale transportation accidents.

The complexity of these disaster risks places Indonesia among the countries with the highest disaster incidence rates in the world, requiring disaster management systems, including victim identification, to maintain the highest standards to ensure the fulfillment of community rights.

In disaster situations, victim identification is one of the most crucial stages in the entire emergency and post-disaster response process. Identification not only concerns medical and technical aspects, but is also closely related to ethical, social, psychological, and legal dimensions. A person's identity is part of human dignity that must be respected by the state. Certainty of the identity of the body not only provides emotional closure for the family, but also serves as an important basis for the implementation of administrative rights such as death registration, inheritance settlement, legal accountability, insurance claims, and marital status management. In the context of human rights protection, the right to have one's identity recognized, even after death, is an integral part of the principle of respect for human dignity as guaranteed in Article 28I paragraph (4) of the 1945 Constitution. Thus, victim identification is not merely a technical process, but a constitutional obligation of the state. (Berketa, 2019).

Internationally, the mechanism for identifying disaster victims has been standardized by Interpol through the Disaster Victim Identification (DVI) protocol. This protocol lists three primary identification methods considered the most scientifically reliable: fingerprints, forensic odontology, and DNA. Of these three methods, forensic odontology plays a significant role due to its high level of reliability, particularly when the victim's body is in a condition that is difficult to visually identify. The structure of human teeth is unique, resistant to decay, high temperatures, and extreme trauma, so they can often be examined even when the victim's body is severely damaged. Several global studies have shown that forensic odontology contributed significantly to international tragedies such as the 9/11 terrorist attacks on the World Trade Center, the 2004 Indian Ocean tsunami, and various plane crashes in various countries (Berketa, 2019; Dorion, 2011).

Contrary to these normative expectations, the implementation of forensic odontology in Indonesia remains far from optimal. Several disaster and mass accident cases demonstrate the limited role of forensic odontology in the identification process, even though the victims' conditions permit dental examinations. For example, in the Sriwijaya Air SJ-182 plane crash (2021), the Glodok Plaza fire (2025), and the multiple accidents on the Ciawi Toll Road (2023), official documentation regarding the use of forensic odontology methods was missing from public reports or statements from the Indonesian National Police's DVI (Detection and Inspection) team. This situation demonstrates a mismatch between the methodological potential of forensic odontology and the reality of its application in the field. These obstacles indicate structural problems within the victim identification system, both institutionally and regulatoryly, and in terms of human resource readiness (Sukendro et al., 2025).

Legally, Indonesia's legal framework actually regulates the state's obligation to identify victims through statutory regulations. Law No. 17 of 2023 concerning Health regulates the provision of health services for legal purposes, including the identification of remains. Government Regulation No. 28 of 2024 emphasizes the obligation of health care

facilities to support the victim identification process. Furthermore, National Police Regulation No. 12 of 2011 states that police medicine, including forensic odontology examinations, falls within the authority of the National Police in carrying out law enforcement and public service functions. However, these regulations are not yet accompanied by robust implementation mechanisms, resulting in a gap between legal obligations and technical practices in the field. One of the biggest challenges is the lack of a uniform national odontogram standard that is mandatory for all healthcare facilities. An odontogram is a graphic representation of an individual's dental condition and is the primary instrument in both antemortem and postmortem examinations. When healthcare facilities lack standardized odontogram records, identification through dental examinations becomes difficult. Furthermore, most healthcare facilities in Indonesia lack a policy of mandatory regular dental examinations accompanied by systematic documentation. Dental records are often not integrated with the national electronic medical record system, resulting in limited antemortem data available to the public. This lack of data is one of the biggest obstacles to the implementation of forensic odontology (Putri & Satria, 2021; INTERPOL DVI Guide, 2018).

Another issue relates to human resource readiness. Forensic odontologists in Indonesia remain severely limited, both in terms of number and geographic distribution. Specialized training in forensics, including mastery of the DVI protocol, remains incomplete and is often only provided by select institutions such as the Faculty of Dentistry at major universities and the Indonesian National Police's Health Center (Pusdokkes Polri). Furthermore, law enforcement officials at the regional level often lack a thorough understanding of the role of forensic odontology, resulting in this method being under-prioritized or even considered in the victim identification process. This demonstrates that implementation issues are not solely technical but also relate to governance, inter-agency coordination, and public policy (Sutaryo & Putra, 2020; Ministry of Health, 2022; Pusdokkes Polri, 2019).

From a legal theory perspective, this situation can be analyzed using Jeremy Bentham's utilitarian theory, which emphasizes that the purpose of law is to maximize public benefit. In the context of disaster victim identification, this benefit is realized through providing identity certainty, family psychosocial recovery, and resolving community administrative rights. If the identification system is ineffective, the law fails to provide these benefits. Therefore, the effectiveness of forensic odontology is an important benchmark in assessing the utilitarian validity of the law. The more optimal the application of this method, the greater the level of legal benefit provided to the public.

On the other hand, the legal positivism theory used in this study emphasizes that legal norms must be analyzed based on the provisions written in the legislation. From a positivistic perspective, the problem of the suboptimal implementation of forensic odontology can be understood as a "normative-practice gap," namely a condition where legal norms exist, but their implementation does not run according to the provisions. A doctrinal review of existing regulations is necessary to identify the legal position of forensic odontology and identify regulatory weaknesses that hinder its implementation. This analysis is crucial for providing

normative recommendations that can strengthen the effectiveness of victim identification in the future (Kelsen, 1960; Raz, 1979; Tamanaha, 2001).

Furthermore, from a disaster governance perspective, victim identification is part of a disaster management system that involves various actors, from medical personnel, police, hospitals, and local governments. However, cross-sector coordination is often suboptimal, resulting in a systematic process for antemortem data collection, postmortem documentation, and data reconciliation. The lack of binding protocols and the absence of an integrated data system make the identification process slow and inefficient. This demonstrates that identification issues are not only scientific but also involve health system governance and law enforcement (Boin & Lodge, 2016).

Given the complexity of these issues, research on the legal aspects of forensic odontology in disaster victim identification in Indonesia is highly relevant. This research is not only crucial for the development of health law and forensic medicine, but it can also significantly contribute to strengthening the disaster victim identification system in Indonesia. Furthermore, this research emphasizes the importance of regulatory reform, harmonization of law enforcement and health agency policies, and the development of national standards for digitally integrated odontograms at the national level. Therefore, this research is expected to provide recommendations for realizing a more effective and efficient victim identification system that provides optimal legal benefits to the public (Interpol DVI Guide, 2018; Perry & Lindell, 2003).

B. RESEARCH METHODS

This research was designed with a methodological approach that combines in-depth legal analysis with a technical understanding of forensic medicine, as the issue of disaster victim identification lies at the intersection of normative and empirical-scientific domains. The methodological framework used was comprehensively structured to provide strong scientific justification for each stage of the analysis, ensuring that the research results are not only descriptive but also provide theoretical evaluation and relevant prescriptive recommendations for policymakers (Soekanto, 2006; Marzuki, 2013).

At the epistemological level, this research positions law not simply as a collection of rules, but as a living system within society that interacts with health institutions, the medical profession, and forensic technology. This approach ensures that the methodology transcends the boundaries between "law on paper" and "law in practice," thus providing a realistic picture of how forensic odontology works (and should work) within the context of disaster victim identification (Creswell & Creswell, 2018; Pretty & Sweet, 2010).

1. **Type of Research: Normative Law with an Interdisciplinary Approach**
   This research uses a normative legal research method, namely research that examines law as a normative rule that regulates behavior and provides legitimacy for institutional actions. This type of research was chosen because the main research issues relate to:
   1) Construction of legal norms,
   2) Evaluation of regulatory effectiveness,
   3) Interpretation of institutional authority,
   4) State obligations in fulfilling identity rights,

5) Regulation of medical records and victim identification,
6) Synchronization of health law and police law,
7) Public policy in the national identification system.

Why is normative legal research used?

Because the main research problem stems from:

1) Unclear norms,
2) Legal vacuum regarding national odontograms,
3) Lack of standardization of dental medical records,
4) Disharmony in cross-sectoral regulations,
5) Suboptimal implementation of DVI guidelines,
6) Weak legal function in ensuring certainty of victim status.

These issues can only be explained and resolved through normative analysis, not experimental or survey research.

2. Research Approach

To ensure both theoretical depth and practical relevance, this study combines six main approaches. Each approach is explained in length and detail to demonstrate its contribution to the analytical framework.

1) Statute Approach

This approach is used to examine the substance of laws and regulations directly and indirectly related to victim identification and dental medical records. The analysis is conducted on:

- The 1945 Constitution of the Republic of Indonesia, especially Articles 28D and 28I,
- Health Law,
- PP 28/2024,
- Population Administration Law,
- Minister of Health Regulation on Medical Records,
- Regulation of the Chief of Staff 12/2011 concerning DVI,
- Dental Ethics and Professional Standards,
- Interpol DVI Guidelines.

The reasons for the importance of this approach:

a) Victim identification is a state obligation → requires a legal basis;
b) Medical records are legal documents → must comply with the Minister of Health Regulation;
c) DVI is the authority of the National Police → requires synchronization with the health sector;
d) standar internasional perlu diadopsi → hukum harus kompatibel.

This approach not only describes the content of the article, but tests:

- Legitimacy,
- Internal consistency,
- Adequacy of content,
- Feasibility of implementation,
- Potential for conflict of authority,
- Substantive gaps.

2) Conceptual Approach

This approach is used to dissect fundamental concepts from various disciplines, so that the research framework does not stop at textual analysis, but at a deep understanding of the nature of the problem.

Concepts analyzed:

- The concept of identity in law and forensics,
- The concept of medical records as scientific evidence,
- The odontogram as an identification instrument,
- The concept of legal certainty in death status,
- The concept of legal personhood,
- The concept of scientific evidence in identification,
- The concept of legal utility in disaster contexts,
- The concept of antemortem vs. postmortem data.

Why are concepts important in research?

- Because concepts influence how the law is interpreted,
- Because conceptual errors can lead to misguided policies,
- Because forensic techniques are only relevant when placed within the framework of scientific evidence,
- Because identity is not just a "name," but a legal status.

With a conceptual approach, research can position forensic odontology as both scientific and legal.

3) Legal Theory Approach

A legal theory approach is used to assess legal structures and provide analytical rationale for research recommendations. This study utilizes several major legal theories and relates them to the context of victim identification.

Teori yang digunakan:

- H.L.A. Hart – Primary and Secondary Rules → to assess whether identification rules in Indonesia are systemically complete.
- Jeremy Bentham – Utilitarianism → to assess whether mandatory national odontograms bring the greatest public benefit.
- Lon Fuller – Internal Morality of Law → to examine whether identification procedures meet the requirements of legal morality (clarity, consistency, and implementability).
- Gustav Radbruch – Legal Certainty → victim identification is part of determining the status of death.
- Lawrence Friedman – Legal Effectiveness → to critique why regulations do not work from a structural, substantive, and cultural perspective.
- John Rawls – Theory of Justice → to assess fair access to victim identification without discrimination.

The purpose of using legal theory:

- Providing a rational framework for thinking,
- Ensuring that the analysis is not merely case-by-case,
- Providing a basis for academic argumentation,
- Ensuring that legal recommendations are prescriptive and defensible.

4) Comparative Approach

In this approach, the study compares the regulations and identification practices of other countries. Comparison is necessary because forensic odontology has developed rapidly in various developed countries.

Comparative countries:

- Japan,
- United Kingdom (NHS Dental System),
- Australia,
- South Korea,
- United States (NAMUS).

The comparison results sought:

- National dental medical record standard model,
- Integration of medical data in the national identity system,
- Dental identification procedures in mass disasters,
- Forensic dentist training standards,
- Legal order mandating a dental registry.

The comparison provides arguments why Indonesia can and should adopt a similar system.

5) Socio-Legal Approach

The socio-legal approach is used to understand the empirical reality of legal implementation. In the Indonesian context, socio-legal approaches are important because:

- Regulations are not automatically implemented.
- Healthcare facility infrastructure varies widely.
- Dental medical record keeping is minimal.
- Forensic dentists are few in number.
- Inter-agency coordination is poorly structured.

Socio-legal questions analyzed:

- Why are dental records often not created?
- Do healthcare facilities have dental radiography facilities?
- Do hospitals understand DVI standards?
- How does legal culture influence regulatory implementation?
- Is the public aware of the importance of dental records?

Pendekatan socio-legal memberikan "konteks hidup" bagi norma.

6) Historical Approach

Used to describe development:

- History of forensic odontology,
- Evolution of DVI standards,
- Changes to the Indonesian medical records system,
- Dynamics of medical and police regulations.

A historical approach is important so that the analysis is longitudinal, not just a photograph of the current situation..

3. Sources of Legal Materials

Research sources are divided into:

- Primary materials,
- Secondary materials,
- Tertiary materials.

Each category is explained in detail to make its contribution clear.

4. Material Collection Techniques

The method of collecting materials is carried out through:

- In-depth literature review,
- Inventory of legal documents,
- Analysis of international documents,
- Search of scientific forensic literature.

5. **Analysis Techniques**

The analysis is done through integration:

- Legal interpretation,
- Deductive analysis,
- Prescriptive analysis,
- Comparative analysis,
- Source triangulation.

This approach ensures a rich analysis in terms of legal logic while remaining scientifically accurate.

6. **Research Validity**

Validity is guaranteed through:

- Material triangulation,
- Theoretical consistency,
- Compliance with international standards,
- Logical coherence of argumentation.

7. **Scope**

The focus of the research is limited to the identification of disaster victims through forensic odontology within the Indonesian legal framework.

8. **Methodological Contributions**

This research method produces:

- An integrated legal-forensic analysis model,
- The basis for developing a national identification policy,
- A comprehensive critique of the legal identification system in Indonesia.

C. RESULTS AND DISCUSSION

1. Overview of the Application of Forensic Odontology in Disaster Victim Identification

Forensic odontology occupies a strategic position in the disaster victim identification system in Indonesia due to its ability to identify victims even when their bodies are severely damaged, decomposed, burned, or beyond visual recognition. Teeth are the anatomical structures most resistant to extreme temperatures, physical pressure, seawater conditions, decay, and other extreme environmental processes. Therefore, dental examination is a key instrument in the Disaster Victim Identification (DVI) process, particularly in disaster cases that damage soft tissue (Pretty & Sweet, 2001; Merlati et al., 2002).

2. Legal Analysis: The Legal Basis of Forensic Odontology in Disaster Victim Identification

1) Constitutional Basis: The Right to Identity as a Human Right

The primary foundation for the role of forensic odontology is found in Article 28I paragraph (4) of the 1945 Constitution, which obliges the state to protect, promote, uphold, and fulfill human rights. In the context of disaster victim identification, the right to identity is part of the right to recognition before the law.

Fulfilling this right is not only an administrative necessity but also a moral obligation of the state. When a victim's identity cannot be determined, the family experiences ambiguous loss—a situation of uncertainty that leads to prolonged and unresolved trauma. Returning the body to the family for a proper burial is part of respect for human dignity.

Thus, identification through forensic odontology is a concrete implementation of the state's constitutional obligation to fulfill the basic rights of citizens, including the victim's family (Donnelly, 2013).

2) Legal Basis: Health Law Number 17 of 2023

The Health Law provides formal legitimacy for medical identification in disaster situations. Article 157 paragraph (1) states that everyone has the right to receive medical services in emergency situations. Article 157 paragraph (4) emphasizes that in disaster situations, health services must still prioritize quality, safety, and humanity.

This norm provides a legal framework for forensic medical services, including forensic odontology, as part of emergency medical services. Because identification is part of medical and legal treatment, the state is obliged to provide mechanisms, resources, and regulations to ensure the process is effective (Donnelly, 2013).

3) Operational Basis: Chief of Police Regulation Number 12 of 2011

Regulation 12/2011 places forensic dentistry as an integral part of the Police Medicine (Dokpol) function and the DVI structure. This regulation defines the role of Dokpol in investigations, including:

- Postmortem examination,
- Collection and verification of antemortem data,
- Victim identity reconciliation,
- And preparation of a post-mortem report (VeR).

The Police Department's position as the vanguard in the search for victim identities makes forensic odontology a mandatory component of every DVI operation. However, this regulation does not yet provide technical standards regarding odontogram formats, dental documentation requirements, and the digitization procedures required for data integration.

3. Empirical Analysis: Case Study of Identification of the Gunung Kuda Cirebon Mine Landslide Disaster (2025)

This case study provides a concrete illustration of the implementation of forensic odontology. In the Gunung Kuda mine landslide, 14 victims were identified by the Cirebon Police and West Java Regional Police DVI Teams.

1) Field DVI Stages

The identification stages carried out include:

- Medical indicators examination
- Property identification examination
- Fingerprint examination
- Dental examination (forensic odontology)

Because most of the victims' bodies were physically damaged by being buried under the material, dental examination became a key instrument.

2) Use of Antemortem Dental Medical Records

The antemortem team collected comparative data from:

- The victim's family,

- clinics or dentists who have treated the victim,
- personal dental photographs and documentation,
- previous dental treatment records.

After matching radiographic data, restorations, and dental morphology, all victims were scientifically identified.

3) Usefulness Value

This success shows that:

- Identification can be done more quickly,
- Costs are lower than DNA testing,
- Families receive immediate legal certainty,
- Mining negligence investigations can proceed,
- Burials can be conducted according to the victim's traditions.

This case serves as empirical evidence of how forensic odontology functions effectively in the context of natural disasters in Indonesia.

4. The Power of Scientific Evidence: Forensic Odontology in the Justice System

In the Indonesian legal system, the results of forensic odontology examinations have the following status:

- Expert testimony
- Part of the Visum et Repertum (VeR)
- Scientific evidence

The evidentiary power of forensic odontology is comparable to DNA and fingerprint analysis, although it complements the overall identification process. Dental restorations, root morphology, tooth abnormalities, and radiographs are "identity signatures" with high evidentiary value.

5. Analysis of the Theory of Legal Utilities: Bentham, Mill, and Radbruch

1) Jeremy Bentham: The Calculus of Happiness

The application of forensic odontology meets Bentham's seven utility variables:

- Intensity: immediate benefits for the family
- Duration: long-term benefits (legal administration)
- Certainty: high identification accuracy
- Temporal proximity: fast results
- Fertility: unlocks legacy benefits (inheritance, death certificate)
- Purity: no negative consequences
- Broad impact: on the wider community

Thus, the benefits of forensic odontology can be measured quantitatively and prove the urgency of its application.

2) John Stuart Mill: Morality and Justice

Mill emphasized the quality of happiness and the morality of law. In this context:

- Victim identification respects human dignity,
- Prevents families from prolonged trauma,
- Prevents administrative uncertainty,
- Maintains the human integrity of the remains.

Thus, the application of dental identification is not only useful, but also moral and fair.

3) Gustav Radbruch: Certainty, Justice, and Benefit

The application of forensic odontology embodies:

- Legal certainty: identity is clearly defined.
- Justice: family rights are fulfilled.

- Social benefits: the DVI process is more efficient and reliable.

The three basic values of Radbruch's law are fulfilled simultaneously.

6. Normative Analysis: Compliance of Odontograms with PP 28 of 2024

PP Number 28 of 2024 regulates medical records, but does not yet regulate standards:

- National odontogram format,
- Digital storage of dental records,
- Interoperability with the Indonesian National Police,
- Use of odontograms for DVI.

This gap causes:

- The quality of community dental data is highly variable.
- Many health facilities do not maintain dental medical records.
- The antemortem-postmortem matching process is slow.
- The success rate of DVI is declining.

Interviews with the Cirebon Police Chief and a Forensic Odontologist from Padjadjaran University confirmed that the absence of a national SOP is a major obstacle to implementation in the field.

7. Discussion: Challenges of Implementing Forensic Odontology

1) Limitations of Antemortem Medical Records
   Most people don't have structured or written dental records. Even in healthcare facilities, dental records often consist of brief clinical notes without radiographs.
2) Non-uniformity of Odontogram Format
   There is no national standard that requires:
   - Odontogram symbols,
   - Description of restorations,
   - Radiographic documentation,
   - International standard 2-digit FDI code.
3) Lack of Forensic Odontology Experts
   Most experts are located in large cities (Jakarta, Bandung, Surabaya), but districts and cities are severely understaffed.
4) Health Infrastructure Limitations
   - Not all hospitals have panoramic imaging equipment.
   - Many community health centers lack radiography facilities.
   - Medical records have not been digitized.
5) Lack of Cross-Sector Integration
   Data from the Ministry of Health, Civil Registration, and the National Police are not connected, so data searches are very slow.

8. The Urgency of Harmonizing Regulations and Establishing National Odontogram Standards

To increase the effectiveness of victim identification, it is necessary:

- Presidential Regulation on the National Identification System
- Integration of Indonesian National Police Health and DVI Data
- Digitization of Dental Medical Records
- National Odontogram Standards Based on INTERPOL DVI
- Mandatory Training for All Dentists
- Medical Record Retention for a Minimum of 10 Years
- Implementation of the Indonesian Odontogram Database System (e-DentalID)

9. Comprehensive Synthesis

This study shows that:

- Normatively, the legal framework is adequate;
- Empirically, forensic odontology has proven effective in the field;
- Theoretically, the role of forensic odontology meets the criteria of legal benefit;
- Implementationally, significant obstacles remain;
- Systemically, Indonesia needs regulatory reform and the digitization of dental medical records.

10. Major Conclusions, Results, and Discussion

1) Forensic odontology is a highly effective primary identification method with a strong legal basis.
2) Victim identification is a constitutional obligation of the state to fulfill the right to identity.
3) The Gunung Kuda case study demonstrates the effectiveness of implementing forensic odontology in disaster situations.
4) The legal basis of the 1945 Constitution, the 2023 Health Law, Government Regulation 28/2024, and Regulation of the Chief of Staff 12/2011 need to be harmonized into a single integrated system.
5) Government Regulation 28/2024 does not yet contain technical standards for odontograms, resulting in uneven implementation in the field.
6) Bentham, Mill, and Radbruch's theory of utility suggests that the application of forensic odontology yields the most optimal legal benefits.
7) Indonesia needs to develop a national identification system based on digital, integrated, and standardized dental medical records.

D. CONCLUSION

This study concludes that forensic odontology has become a vital and reliable component of Indonesia's disaster victim identification system. Although the legal framework spanning the Constitution, national laws, and police medical regulations has provided adequate normative support, these provisions have not yet been fully transformed into standardized and integrated operational guidelines at the institutional level. The absence of national standards for odontograms, insufficient antemortem data integration, and the lack of universal requirements for dental recordkeeping remain key obstacles.

Empirical evidence from the Gunung Kuda landslide case demonstrates that dental profiling is highly effective in identifying victims with severe bodily damage, with limitations arising primarily from inadequate antemortem records rather than methodological shortcomings. This finding reinforces earlier studies emphasizing the central role of dental record availability in successful identification.

From a legal-philosophical perspective, forensic odontology aligns with utilitarian, moral, and justice-based theories articulated by Bentham, Mill, and Radbruch. Its application ensures legal certainty, respects human dignity, alleviates the suffering of families, and fulfills essential elements of substantive justice. To achieve an effective, accountable national identification system, structural reforms are required, including national odontogram digitalization, inter-institutional data integration, improved professional competency, standardized SOPs, institutional strengthening of DVI and police medical units, and enhanced public awareness of dental records. In sum, forensic odontology represents a strategic legal-scientific mechanism for disaster victim identification and supports the state's duty to uphold human rights, legal certainty, and modern disaster governance. Continued development of policy and information systems for dental medical records is therefore a strategic and normative necessity for Indonesia as disaster risks increase.

Bibliography

Avon, S. L. (2004). Forensic odontology: The roles and responsibilities of the dentist. Journal of the Canadian Dental Association, 70(7), 453–458.

Berketa, J. (2019). Forensic Odontology and Disaster Victim Identification. CRC Press.

Bowers, C. M., & Bell, G. L. (2016). Forensic Dentistry. Elsevier.

Bushby, S., & Verrill, C. (2020). The role of forensic evidence in global disaster victim identification. Forensic Science International, 315, 110432.

Cameron, J. M., & Sims, B. G. (2018). Forensic Dentistry: An Essential Guide. Wiley-Blackwell.

Cattaneo, C. (2007). Forensic anthropology: Developments of a classical discipline in the new millennium. Forensic Science International, 165(2–3), 185–193.

Creswell, J. W., & Creswell, J. D. (2018). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage.

De Boer, H., Van Der Lugt, C., & Vos, W. (2021). Digital dental records in forensic identification: Global standards and challenges. Journal of Forensic and Legal Medicine, 84, 102251.

Donnelly, J. (2013). Universal Human Rights in Theory and Practice (3rd ed.). Cornell University Press.

Dorion, R. B. J. (2011). Bitemark Evidence: A Color Atlas and Text. CRC Press.

Ellingham, S. T. D., Thompson, T. J. U., & Islam, M. (2015). Estimating temperature exposure of burnt remains by colorimetric analysis. Science & Justice, 55(1), 10–17.

INTERPOL. (2018). Disaster Victim Identification Guide. INTERPOL General Secretariat.

International Committee of the Red Cross (ICRC). (2019). Management of Dead Bodies After Disasters: A Field Guide for First Responders. ICRC.

Kaur, R., Singh, A., & Dhillon, G. (2020). Dental records and their role in forensic identification. Journal of Forensic Odontology, 38(1), 22–28.

Kelsen, H. (1960). Pure Theory of Law. University of California Press.

Kemenkes RI. (2022). Pedoman Rekam Medis dan Manajemen Informasi Kesehatan. Jakarta.

Lain, R., Taylor, J., Butler, J., & Nambiar, P. (2020). Advances in forensic odontology identification techniques. Australian Journal of Forensic Sciences, 52(4), 452–465.

McKenna, C. J., Barton, S., & Dyer, W. (2017). Improving postmortem dental identification using digital imaging technology. Journal of Forensic Radiology and Imaging, 9, 35–42.

Marzuki, P. M. (2013). Penelitian Hukum. Kencana.

Merlati, G., Savio, C., Danesino, P., Fassina, G., & Miotti, A. (2002). Observations on dental structures when placed in high temperature conditions. Journal of Forensic Sciences, 47(3), 601–604.

Morgan, O. W., Sribanditmongkol, P., Perera, C., Sulasmi, Y., Van Alphen, D., & Sondorp, E. (2006). Mass fatality management following the Asian tsunami: Case studies in Thailand, Indonesia, and Sri Lanka. PLoS Medicine, 3(6), e195.

Mundorff, A., & Vidoli, G. (2015). The DVI process: Legal and ethical issues in mass fatality management. Forensic Science Policy & Management, 6(3–4), 81–93.

Perry, R. W., & Lindell, M. K. (2003). Preparedness for emergency response. Disasters, 27(4), 336–350.

Pretty, I. A., & Sweet, D. (2001). A look at forensic dentistry. British Dental Journal, 190(6), 359–366.

Pretty, I. A., & Sweet, D. (2010). Forensic dentistry: A comprehensive review. Journal of Forensic Sciences, 55(6), 1502–1508.

Prabowo, Y. A., & Rukmini, T. (2020). Analysis of the effectiveness of DVI protocols in major disasters in Indonesia. Indonesian Journal of Health Law, 6(2), 112–129.

Putri, A., & Hidayat, R. (2021). Challenges of dental medical records in forensic identification. Indonesian Journal of Dentistry, 8(2), 124–133.

Putri, D., & Satria, A. (2021). The role of dental medical records in supporting DVI identification. Forensic Health Journal, 5(1), 45–55.

Indonesian National Police Medical Center. (2019). DVI Implementation Guidelines. Indonesian National Police.

Raz, J. (1979). The Authority of Law. Clarendon Press.

Soekanto, S. (2006). Introduction to Legal Research. UI Press.

Stimson, P. G., & Mertz, C. A. (2017). Forensic Dentistry (2nd ed.). CRC Press.

Thali, M. J., Viner, M. D., & Brogdon, B. G. (Eds.). (2011). Brogrdon's Forensic Radiology (2nd ed.). CRC Press.

Sukendro, D., et al. (2025). Analysis of the implementation of forensic odontology in mass accidents. Journal of Forensic and Medicolegal Studies, 11(1), 77–92.

Sutaryo, & Putra, D. (2020). Barriers to DVI implementation in a disaster context. Journal of Health Policy, 13(3), 198–210.

Sweet, D. (2010). Forensic dental identification. Forensic Science International, 201(1–3), 3–12.

Tamanaha, B. Z. (2001). A General Jurisprudence of Law and Society. Oxford University Press.

Indonesian National Police DVI Team. (2024). Indonesia DVI Annual Report 2024. Jakarta.

UNDRR. (2015). Sendai Framework for Disaster Risk Reduction 2015–2030. United Nations.

Law of the Republic of Indonesia Number 17 of 2023 concerning Health.

Government Regulation of the Republic of Indonesia Number 28 of 2024 concerning the Implementation of the Health Sector.

Regulation of the Chief of the Indonesian National Police Number 12 of 2011 concerning Police Medicine.