G19 An Innovative Approach to the Importation and Conversion of Antemortem (AM) Dental Data to Blockchain-Protected Forensic Data for Utilization in Disaster Victim Identification (DVI)

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Learning Overview: After attending this presentation, attendees will better understand the potential value of integrating blockchain technology into the field of forensic odontology. By automating the conversion and importation of a patient's dental records into a standardized AM dental database, the data can then be stored in an immutable ledger using blockchain-based architecture. This will allow the information to be securely stored and shared among DVI teams from around the world.

Impact on the Forensic Science Community: This presentation will impact the forensic science community, and especially the forensic odontology community, by demonstrating how blockchain technology adoption should create a universal trustworthy ecosystem for DVI teams to identify global victims more accurately and in a more timely manner than traditional methods.

Disasters are difficult to predict, and, in most cases, cannot be prevented. The number of casualties involved varies depending on the type and location of the disaster. Such disasters leave behind thousands of victims from many nations, making the process of identifying multinational victims a challenging task for the international DVI team. Collecting AM dental records from multiple nations is the key requirement in the reconciliation process with Postmortem (PM) data.

Forensic odontologists face key issues when dealing with AM dental records, which can hamper the identification process. First, the readability and quality of the recorded AM data in their original dental charts and their accessibility to the DVI team requires a solution that provides up-to-date accurate information at a minimally acceptable standardized format that can be readily understood by multiple nations. Second, dental codes are inconsistent across countries, and this requires manual conversion of dentists' codes into the standardized format for forensic odontologists used by DVI teams. This manual conversion process risks the introduction of human errors that can inadvertently introduce irreconcilable discrepancies that will hinder the reconciliation process.

This study proposes a Universal blockchain-based Dental record & Translator (UDenT) for multinational disaster victim identification. UDenT aims to automatically convert incompatibly formatted primary dental records into a unified dental record coded using standardized DVI codes such as those recommended by the International Criminal Police Organization (INTERPOL). In addition, it stores the converted dental records into an immutable distributed ledger on a blockchain-based architecture to be shared among worldwide DVI teams. This would allow for immediate access, at any time, in any place, of any victim's AM dental records in a readily understood universal format. UDenT's goal is to build the right ecosystem for DVI teams to identify global victims accurately and in a timely manner and, by creating this ecosystem, preserve their human rights along with their families.

Dental Records, Disaster Victim Identification, Blockchain Technology