Using dental records in personal identification

Researchers at the University of Tokushima in Japan have established a medical database which uses dental records as a form of personal identification

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Arguably, the use of dental findings of personal identification is one of the most important ways to verify the victim's identity in the event of a disaster. For example, some of the victims of the 2005 London bombings and 2017 Grenfell Tower fire in London have been identified by dental records.

In Japan, on March 11, 2011, the Great East Japan Earthquake and Tsunami occurred. This earthquake saw 15,897 casualties, 2,533 missing persons, and caused extreme amounts of damage. Approximately 10% of the victims were identified using their dental findings. It was made evident during these personal identifications the importance of storing detailed records of dental findings while one is alive, and the necessity of a swift collection of dental findings at the time of a disaster.

Currently, most comparisons are conducted manually. A major earthquake in the Nankai Trough, something feared to occur sooner or later, has the possibility of causing roughly 20 times the damage that the Great East Japan Earthquake caused. This calls to concern that the current methods cannot provide sufficient enough support. This is why it is thought that drastic digitisation is necessary for the accurate collection and storage of information while people are alive and the swift collection and analysis of information at the time of disaster.

Using a dental chart

Personal identification of victims during disasters can be conducted using facial features and

Expedited collection of dental findings due to image analysis

Expedited collection of of x-ray findings due to AI analysis
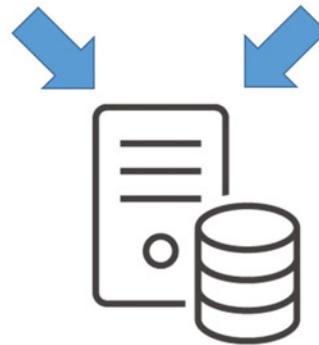
Store information in a database
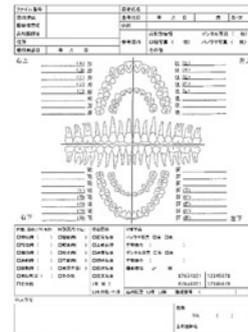
Create dental charts
Use for personal identification during disasters

clothes in the early stages. However, as time passes, this can become difficult. As those methods become difficult, dental findings are likely to be used as a method of confirmation. Judgement at this stage is extremely important in order to return the remains to their families as soon as possible. Personal identification with dental findings are conducted using a dental chart. First, a dental chart is created by documenting the state of the mouth of the remains. Next, a patient chart or x-rays are ordered from a nearby dental clinic, and that citizen's dental chart is created. Then, their identity is specified by comparing these two dental charts.

The number of victims predicted from a major earthquake in the Nankai Trough is 320,000 people across all of Japan. One dentist was able to take charge of around 20 remains per day during the Great East Japan Earthquake. As a result of this, it has been predicted that there will be a shortage of dentists that are able to work on personal identification. Moreover, as it occurred in the Great East Japan Earthquake, dental clinics may be washed away by tsunamis or burnt down, making it even more difficult to collect patient charts and x-ray photographs. This is why oral information and x-ray photographs need to be digitised and stored. This research aims to find a solution to these problems.

Future applications: large-scale disasters

Image data analysis technologies boasted by the Terada Lab at The University of Tokushima Department of Information Science and Intelligent Systems will be used to automatically analyse and digitise oral photographs and 3D scan data for information regarding the number of teeth, cavities, fillings, crowns, and other information.

In addition to this, the Artificial Intelligence (AI) and image analysis technologies boasted by Medihome Inc. will be used to digitise examination and x-ray findings. This data will be stored in a database and will then be used to conduct swift identification comparisons when any large-scale disasters like a major earthquake in the Nankai Trough occur.

We are building an 'Awa I Net', which is a way to connect the major medical institutions and nursing homes in Tokushima Prefecture together to allow them to reference medical information with each other of residents that have agreed to participate in this scheme. However, it is important to note that in the future, we are aiming to store data in this type of medical network and put it into effective application during large-scale disasters.

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