

Creating Awareness Regarding Forensic Odontology Among Non-Forensic Persons for Successful Dental Identifications

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Abstract

Visual Identification by next of kin is the most common method of identifying unknown bodies in India. However, this technique is unscientific and unreliable, especially if the remains recovered are decomposing, skeletonized, charred, mutilated, saponified. Primary identifiers recommended by higher authorities for scientific identification of unknown bodies include comparison of fingerprints, DNA, odontology or unique medical records such as implants. Forensic Odontology has played a major role in identifying victims of mass disasters around the world, and few examples of successful application of dental data in DVI situations include the South Asian Tsunami, 2004, Black Saturday bushfires, 2009, Australia, Christchurch earthquake, 2011, etc. However, the application of forensic odontology for positive identifications is extremely limited. A major reason for this is the unavailability and inaccessibility to quality dental records and ante mortem data. To improve the collection of ante mortem data, it is urgent that we create awareness among local on-ground investigating agencies, and stakeholders. For this purpose, an awareness campaign iDENTifyme from the University of Turin, Italy was launched in India in local languages, and has since successfully assisted in collection of ante mortem data for positive identification.

Keywords: Ante Mortem Data Collection, Awareness Campaign, Identification Forensic Odontology, Missing Persons

Introduction

Identification of human remains forms a significant aspect of medico-legal investigation. It is based on matching scientific information of the unidentified dead body with information obtained about the missing person. Human identification is pertinent not only from the legal point of view but also for social and humanitarian reasons. A positive identification fulfills legal requirement and enables the families to find closure and move on. Anonymous burial or cremation is akin to a life which was unremembered and without consequence, it also

goes against the belief of many cultures, religions and ethical systems.

According to data published by the national crime record bureau, 34592 unidentified dead bodies were recovered and an inquest was conducted during the year 2015¹. As per data on missing persons in Crime in India, a total of 2,90,439 people in 2016, 3,05,267 people in 2017, and 3,47,524 people in 2018 have been reported as missing².

In India, one of the most common technique for identifying an unknown or unclaimed body is by visual recognition by the next of kin. Visually identifying a

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body can prove to be extremely difficult in cases of decomposing, skeletonized, charred, saponified, mutilated or dismembered human remains. Mutilation of bodies is often done by criminals to destroy any trace of identity by slashing, gouging, pounding, dismemberment, burning or use of corrosives. Visual Misidentification by relatives may also be deliberate for malafide intentions. To avoid misidentification of unknown bodies, it is recommended that standardized policies and procedures developed by the authorities should be applied for identifying such bodies. The Interpol guidelines recommended primary identifiers which include fingerprint, DNA and odontology.

Forensic Odontology

There are many aspects of forensic odontology which are often discussed and routinely used for medico-legal work such as dental age estimation in living as well as deceased, bite mark analysis, cranio-facial trauma analysis, assessment of patterned injuries in cases of child abuse, domestic violence, dental malpractice, dental negligence, dental fraud, dental manifestations of child abuse, etc.

Forensic odontology plays a major role during the process of identification, however, unlike fingerprints or DNA, the investigating officers are not always aware regarding odontology or techniques employing teeth for the purpose of scientific identification. It is important that the investigating agencies and clinical dentists be made aware and trained regarding various aspects of forensic odontology and the techniques employed for dental identification. Comparative dental identification depends on the recognition, availability, accessibility and quality of the dental records of the missing person or the presumed deceased victim. The dearth of antemortem records is a major concern among practicing forensic odontologists while performing dental identifications in India. Awareness and training among clinical practitioners will go a long way by recording vital information during dental examination for the purpose of maintaining dental records for forensic investigations.

Ante Mortem Data Collection

According to protocols laid down for Disaster Victim Identification by Interpol, the four steps to identification

include scene examination, post mortem data collection, ante mortem data collection, and reconciliation with families after positive identification³. Dental data collected from the unidentified body is compared to the information obtained about the missing person. For comparison of this post mortem data, experts need access to all dental evidences left behind by the missing person including old dental appliances at home, removable prosthetics, bleaching trays, retainers, old dentures, medical or dental records, etc. It is also very helpful if the next of kin can provide photographs of the missing person showing other prominent features such as scars, tattoos, or a clear view of teeth. It should be noted that dignity and respect for cultural, religious and individual preferences while dealing with the families should be given utmost priority. Families are often under distress while they await news regarding their missing loved ones, and they may not be able to comprehend scientific technicalities explained by the experts. Delay in identification and the uncertainty surrounding this process affects mourning rituals, additional frustration and psychological stress. For this purpose, posters and videos explaining the process in local languages have proven to be helpful in practice by first author, it also helps justify the demands for ante mortem data, which may seem irrelevant and unreasonable at the offset to family members.

Awareness Campaign

Since investigating agencies are at the forefront of collecting records of missing persons from their family, friends, relatives, colleagues, and other relevant contacts, it becomes crucial that they be well versed with what constitutes useful antemortem dental data. iDENTifyme campaign was launched by the Human Identification Laboratory at University of Turin, Italy⁴. It has since been introduced in India and has proven to be successful for collection of ante mortem records for identification of unknown remains. The purpose of iDENTifyme campaign is to create awareness among non-forensic personnel, like investigating officers, clinical practitioners, families of missing people, regarding retrieval of data of missing persons to aid in dental identification. This campaign is in the form of informative posters and video which are easy to comprehend by non-dentists or non-forensic

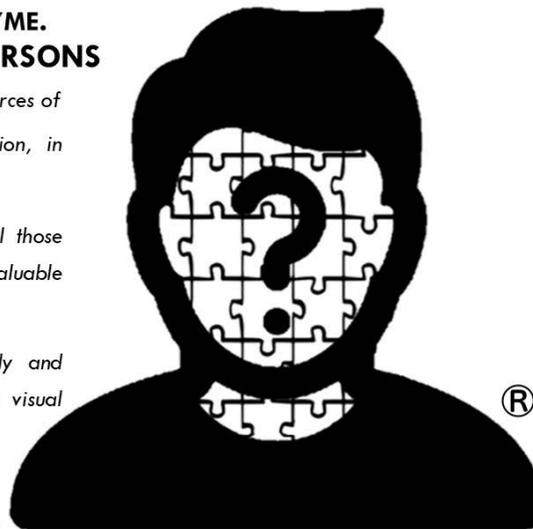
personnel. The campaign is designed for digital platforms for wider circulation through social media, and ease of conversion to multiple languages.

INFORMATIVE CAMPAIGN IDENTIFYME. FOR MISSING AND UNIDENTIFIED PERSONS

Help families and relatives to identify other possible sources of dental information useful for personal identification, in combination with the initial disappearance report.

The forensic dentist will be able to convert all those information related to teeth, mouth and dentistry into valuable individualizing data.

Forensic Odontology offers the most timely and reliable analysis for identifying human remains when visual recognition is no longer conceivable or appropriate.



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India

SPORTS MOUTHGUARDS

Professional, semi-professional or amateur sportspersons may wear a sports mouthguard.

Dentists make tailored mouthguards or they can be bought in sports stores.

Sports mouthguards record teeth patterns and impressions of upper or inferior dental arches. Also, DNA could be found in traces of saliva.

If you find one of these devices, report it to the Police and have it sent to a Forensic Odontologist.



#iDENTifyme Campaign



NIGHT GUARD AND CLENCHING

When a person grinds their teeth while not chewing we call it **bruxism**.

The solution proposed by dentists is a **nightguard** to prevent **grinding** from further harming and wearing **teeth**.

A tailored nightguard can record teeth patterns and impressions of upper or inferior dental arches. Also, DNA could be found on traces of saliva.

If you find one of these devices, report it to the Police and have it sent to a Forensic Odontologist.



#iDENTifyme Campaign



PORTRAIT PICTURES



Portrait pictures showing a smile and teeth can be an extraordinary source of «**dental**» information.

Dental features are shown could represent strong identifiers in the comparison of Antemortem and Postmortem data, helping in the inclusion but also exclusion of candidates.



Search for and forward these images to the Police and Missing Persons Associations

#iDENTifyme Campaign



SELFIES IMAGES

Selfies images showing a **smile** and teeth can be a extraordinary source of «**dental**» information.

Forensic odontologists will be able to recognise diastemas, rotated or wrongly positioned teeth, lip anomalies, recognizable prosthetics, dental crowns, discolourations, dental piercing.

Search and send these images to the Police and Missing Persons Associations.



#iDENTifyme Campaign

PIERCING IN THE MOUTH?



Do you recall the missing person had a piercing through the tongue or on a tooth?

Report this information to the Police, as it could help in the comparison of data available.



#iDENTifyme Campaign

ORTHODONTIC RETAINER

At the end of an orthodontic treatment, dentists apply custom-made **retainers**, either removable or fixed. Removable retainers are usually made of wires or clear plastic, and they can be worn for one or more years.

An old retainer may still be kept at home, among childhood «souvenirs». Also, DNA could be found.

If you find one of these devices, report it to the Police and have it sent to a Forensic Odontologist.



#iDENTifyme Campaign

DENTAL WHITENING TRAY

One of the most common dental whitening systems involves custom-made **trays** filled with bleaching solution that fit firmly over **teeth**.

Used bleaching trays may still be kept home, and could also contain DNA traces.



If you find one of these devices, report it to the Police and have it sent to a Forensic Odontologist.



#iDENTifyme Campaign

RADIOGRAPHIC IMAGES



Dental diagnosis is usually supported by several X-Rays: on the left, a **Panoramic OPG** of the mouth, on the right, a **Cephalometric radiography** of the skull, used extensively in orthodontics to assess the relationships between teeth, jaws and facial skeleton.



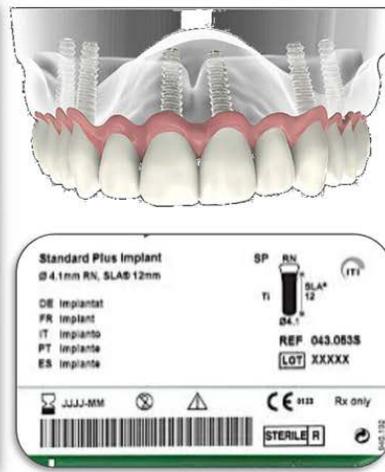
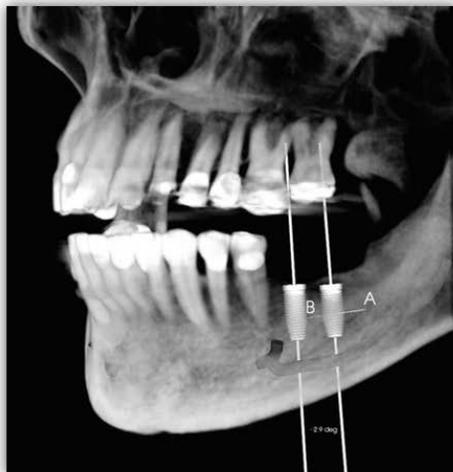
There could be X-Ray images at home or at your dental clinic. Even **outdated X-Ray images** are an extremely valuable source identifying information.

Search among the documents of the missing person and call the dentist for a wider search.



#iDENTifyme Campaign

DENTAL IMPLANTS



Dental implants are a replacement for tooth roots and provide a strong foundation for a fixed but also removable artificial teeth. There are hundreds of different dental implants titanium screws and companies.

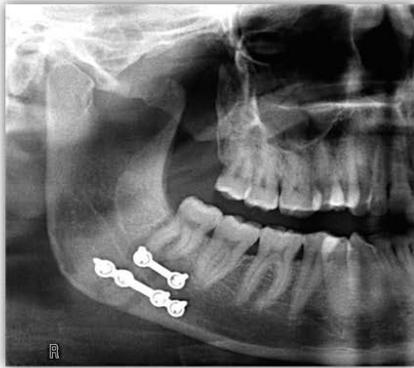
Did the missing person receive one or more dental implants?

Dental Implants have an **identifying label** recorded in the patient record and given to the patient. Try to find it or call your dentist.



#iDENTifyme Campaign

FACE & JAWS TRAUMAS



Trauma to the face can cause mandible, jaws, or teeth fractures. These fractures are treated using **titanium plate fixings and screws**, during maxillo-facial surgery.

Report any traumas - car or bike accidents, accidental fall – occurred to the head of the missing person to the Police. Maybe it produced a fracture. This will allow forensic experts to collect X-ray images from hospitals with a maxillo-facial division.



#iDENTifyme Campaign

FULL-PARTIAL DENTURE

Dental technicians are part of the dental team. Their technical role is to transform the impression taken and a prescription issued by a dentist into a custom made dental device for the single use of a dental patient.

There are many dental devices.



Depending on the legal system of your Country, dental devices may fall within **Medical Devices** regulations. This is to guarantee the quality and traceability of materials.

Call your dentist if the missing person was wearing a dental device: there could be documents, **clinical photographs, certifications of conformity.**

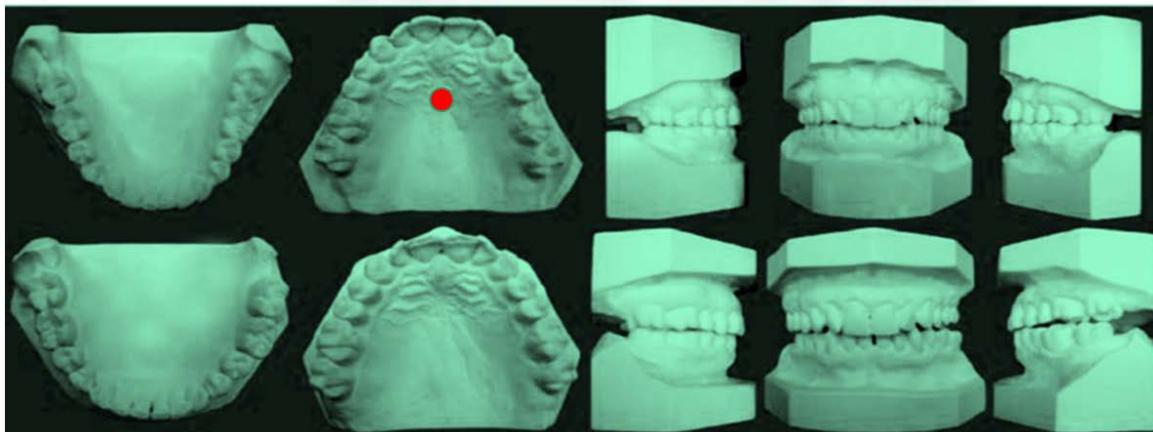


#iDENTifyme Campaign



#iDENTifyme Campaign

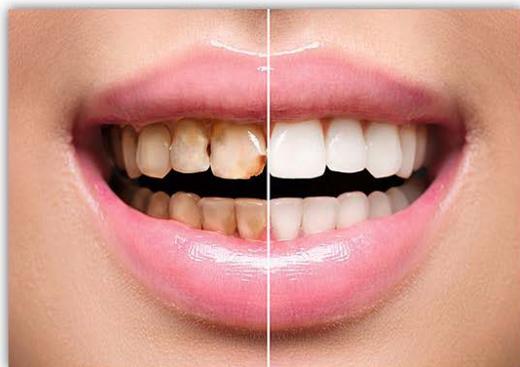
DENTAL MODELS



Dentists and orthodontists take impressions of patient's dental arches to construct study models of the mouth. **Study models** serve for the construction of dental appliances, dentures, orthodontic treatment.

Call your dentist: dental models could still be available in dental clinics or in the dental technician's laboratory and represent a source of identifying dental features including ● **palatal rugae**.

ORAL HYGIENE STATUS



Each person has different **oral hygiene practices and habits**, which will have a great influence in **oral health** status. This includes **alcohol and tobacco consumption**.

A condition of **poor oral hygiene and dental neglect**, such as lack of regular brushing and flossing, and dental visits, will result in dental and gum diseases, presence of plaque and tartar on teeth, enamel erosion, and various pigmentations.

These conditions may cause oral pain and gum inflammation with cyclical self-prescribing of medicine, such as pain killers and antibiotics. The oral hygiene habit of the missing person should be reported to the Police and transmitted to a Forensic Odontologist for interpretation and can give extra clues to the biological profile in the comparison identification process.

#iDENTifyme Campaign



COMMUNICATE NAME OF DENTISTS TO POLICE

When reporting a missing person to the Police, **don't forget** to communicate the name or names of the Oral Health Professionals, Dental Clinics and Hospitals who have been visited, treated or hosted the missing person.

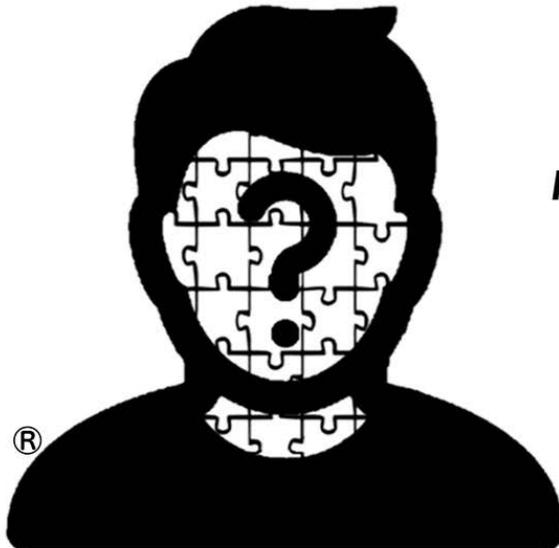
You may not remember names or circumstances, but when you do, don't forget to report this information.

Every information regarding the medical and dental history of a person can lead to a tailored search and research on identifying data.



#iDENTifyme Campaign

INFORMATIVE CAMPAIGN IDENTIFYME FOR MISSING AND UNIDENTIFIED PERSONS



**OUR HOPE IS
RESCUE AND FIND THE MISSING,
AND IDENTIFY THE DECEASED.**



Forensic Odontology and Human Identification
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Translation into Local Languages

The purpose and nature of identification process should be explained to the police officer on ground and the next of kin in local, easy to understand languages. For collection of ante mortem data, media can be used as

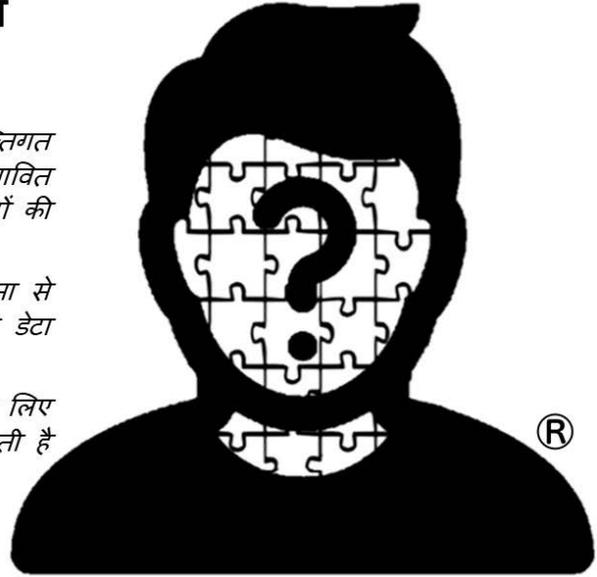
an effective tool for communication. These posters and video can be translated into local languages for wider circulation. Examples of these posters after conversion to Hindi language created for awareness among police officers in the author's most frequent region of practice can be referred to.

सूचना अभियान IDENTIFYME, लापता और अज्ञात व्यक्तियों के लिए।

प्रारंभिक पहचान रिपोर्ट के साथ संयोजन में, व्यक्तिगत पहचान के लिए उपयोगी दंत जानकारी के अन्य संभावित स्रोतों की पहचान करने के लिए परिवारों और रिश्तेदारों की मदद करें।

फॉरेंसिक दंत चिकित्सक दांतों, मुंह और दंत चिकित्सा से संबंधित उन सभी सूचनाओं को मूल्यवान व्यक्तिगत डेटा में परिवर्तित करने में सक्षम होंगे।

फॉरेंसिक ओडोन्टोलॉजी मानव अवशेषों की पहचान के लिए सबसे सामयिक और विश्वसनीय विश्लेषक प्रदान करती है जब दृश्य मान्यता अब बोधगम्य या उपयुक्त नहीं है।



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क्ष-किरण फ़िल्म (एक्स रे फ़िल्म)



डेंटल डायग्नोसिस को आमतौर पर कई एक्स-रे द्वारा समर्थित किया जाता है। बाएं के एक पैनोरमिक ओपीजी पर, खोपड़ी के दाहिनी ओर एक सेफालोमेट्रिक रेडियोग्राफी पर, दांत, जबड़े और चेहरे के कंकाल के बीच संबंधों का आकलन करने के लिए ऑर्थोडॉन्टिक्स में बड़े पैमाने पर उपयोग किया जाता है।

घर पर या आपके डेंटल क्लिनिक में एक्स-रे चित्र हो सकते हैं। यहां तक कि पुराने एक्स-रे चित्र भी जानकारी की पहचान करने का एक अत्यंत मूल्यवान स्रोत हैं।

लापता व्यक्ति के दस्तावेजों के बीच खोजें और एक व्यापक खोज के लिए दंत चिकित्सक को बुलाएं।

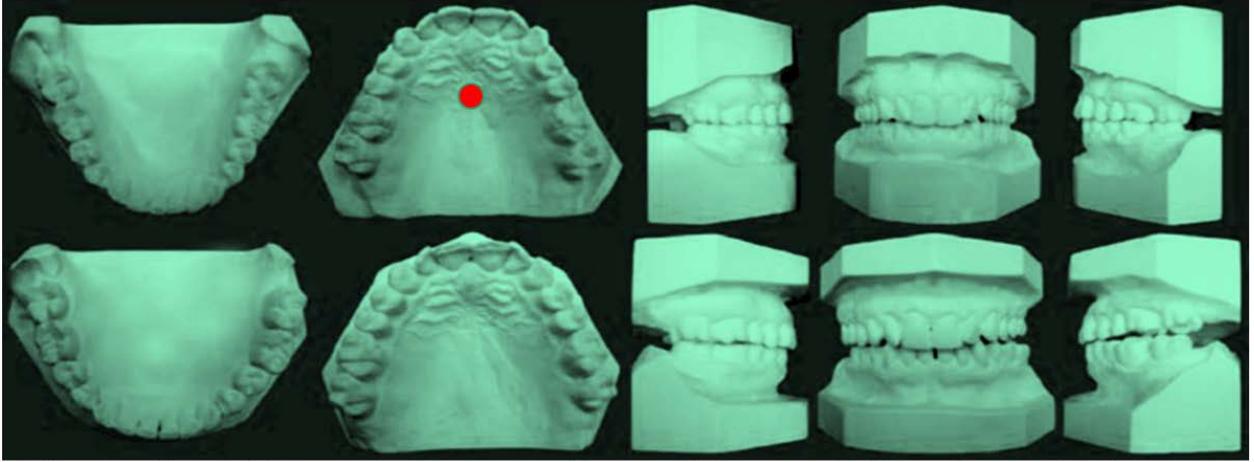


#iDENTifyme Campaign



#iDENTifyme Campaign

दंत मॉडल



दंत चिकित्सक और ऑर्थोडोन्टिस्ट मुंह के अध्ययन मॉडल का निर्माण करने के लिए मरीज के दांतों के छाप लेते हैं। अध्ययन मॉडल दंत चिकित्सा उपकरणों, डेन्चर, ऑर्थोडॉन्टिक उपचार के निर्माण के लिए काम करते हैं। अपने डेंटिस्ट से बात करें: डेंटल मॉडल अभी भी डेंटल क्लिनिक में या डेंटल तकनीशियन की प्रयोगशाला में उपलब्ध हो सकता है और पैलेट रुगे सहित दंत विशेषताओं की पहचान करने के स्रोत का प्रतिनिधित्व कर सकता है।

सूचना अभियान IDENTIFYME, लापता और अज्ञात व्यक्तियों के लिए।



हमारी आशा है लापता की खोज और बचाव, और अज्ञात मृतक की पहचान।



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Conclusion

The robust nature of teeth and the well protected environment in which they are located means that they are often found intact in decomposing, mutilated, saponified, even charred bodies. They become a rich source of information for creating a biological profile of the unknown remains with the help of age estimation, sex estimation, racial profiling, and other hints regarding habits such as tobacco chewing, occupational features such as notching, or any pathologies⁵.

Using dental data for scientific identifications is a reliable, quick, economical and universally accepted method. For this reason, it is often the “go to” method in disaster victim identifications including high impact accidents such as plane crashes. The unavailability and inaccessibility to ante mortem dental data is a major hindrance in performing dental identifications and further, justifying the role of forensic odontologists as a part of forensic team in medico-legal investigations.

Any information that could help identify a body or set of human remains should be collected by the police and handed over to the experts. A holistic approach towards forensic identifications will ensure that there are better chances of correctly identifying the unknown body, if the data is reliable, complete, detailed and specific⁶. The Forensic odontologists should always be involved in the human identification process, when jaws and teeth are present. Failure to perform a complete dental autopsy, with full X-ray imaging, can lead to a delay in positive identification and human rights violations⁷.

A multidisciplinary approach is the key to dissemination of knowledge and awareness about the utility of forensic odontology in investigations. In recent times, due to extensive interactions between forensic odontologists, forensic medicine experts, forensic scientists and senior police officers at workshops, conferences and other such forums, odontology has been

recognized as a vital aspect of identification procedures. But for forensic odontology to truly become a technique of choice for identifications, it is pertinent that this awareness also be created among personnel who work at ground level during investigations including constables, sub inspectors, clinical dentists, autopsy personnel, etc. iDENTify me campaign aims to bring about this awareness by visual aids in local languages for wider circulation through social media.

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