

# Help Bring Me Home: Dental Perspective

Rohini Dua<sup>1</sup>, Gulshen Kaur Kochhar<sup>2</sup>, Ripin Garewal<sup>3</sup>, Annupriya Khanna<sup>4</sup>, Ramandeep Kaur<sup>5</sup>

1-Professor and Head , National Dental College and Hospital, Derabassi, Mohali, Punjab.2,3-Reader, National Dental College and Hospital, Derabassi, Mohali, Punjab. 4-Senior lecturer, National Dental College and Hospital, Derabassi, Mohali, Punjab. 5-PG student, National Dental College and Hospital, Derabassi, Mohali, Punjab.

Correspondence to:  
Dr. Ramandeep Kaur, Reader, PG student, National Dental College and Hospital, Derabassi, Mohali, Punjab.  
Contact Us: www.ijohmr.com

## ABSTRACT

New incidents of missing children are becoming more prevalent day by day. This results in emotional and psychological trauma for both the missing child and the family. The dentist can help the parents to ensure the safety of their children by educating them about ways to keep important records of the child. This paper provides information about various tools and techniques that help in tracing and identifying the missing children. It includes toothprints, labeled dental fixtures, DNA extraction from tooth and saliva, serial number engraving on children's teeth. Thus, a dentist not only helps as oral health care provider but can also be a hero by reuniting the missing child with his or her loved ones.

**KEYWORDS:** Missing Children, Tooth prints, Radiographs, Labelled dental fixtures, Palatal Rugoscopy

## INTRODUCTION

Missing children is a multi-dimensional problem with raising the percentage of children and young adults<sup>1</sup>. The emergence of tragic stories of missing children have been reported everyday.<sup>1</sup>

Due to today's unsafe society, one of the worst fears parents have is that their children could get lost, or worse, abducted. This causes emotional and psychological trauma for both the missing child and the family.

The National Center for Missing & Exploited Children acts as the national clearing house by assisting law enforcement, families and the professionals who report the cases of missing and exploited children and provide information regarding them.<sup>2</sup>

According to the FBI, in 2014, the total number of missing children entries into NCIC was 466,949 and in 2015 the NCIC entries were 460,699.

Indian Parliament shows that every year nearly 1 lakh children going missing and more than 3.25 lakh children went missing from 2011 to 2014 (until June).

In India, Maharashtra is the most common involved state in terms of missing children with over 50,000 having disappeared in the past three and half years. Madhya Pradesh, Delhi, and Andhra Pradesh are distant competitors with all recording less than 25,000 missing children for the period as we can see in figure 1.<sup>3</sup>

The American Dental Association stated: "The ADA encourages dental societies, related dental organisations, and the membership to participate in efforts designed to help in identifying missing and/or deceased individuals via dental records and other appropriate mechanisms".<sup>4</sup>

Many programs have been developed and sponsored by community groups that use various child identification methods.<sup>5,9</sup>

- Masons sponsored the Child Identification Program (CHIP) which gathers saliva samples for DNA fingerprinting, toothprints.
- American Football Coaches Association sponsored the National Child Identification Program which uses an identification card including a physical description, fingerprints, photographs, and the physician's office address/telephone number.
- Massachusetts Free Masons and the Massachusetts Dental Society sponsored the New England Kids Identification System (KIDS) which gathers DNA material into the CHIP events by incorporating dental bite impression and cheek swabs.

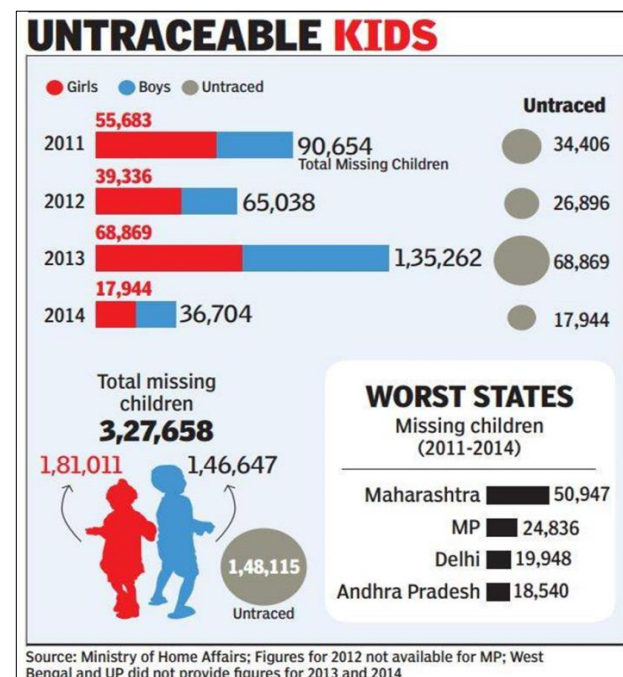


Figure 1

How to cite this article:

Dua R, Kochhar GK, Garewal R, Khanna A, Kaur R. Help Bring Me Home: Dental Perspective. *Int J Oral Health Med Res* 2017;4(2):37-40.

## DENTIST'S ROLE IN SAVING THE IDENTITY OF CHILD

Dentists have a key role in maintaining the healthy teeth. Apart from doing this noble cause of making teeth disease free we as dentists can also help in saving the identity of a child by maintaining a detailed dental record.<sup>12</sup> The role of the dentist in the resolution of reported missing persons is very important but also involves cooperation and assistance.<sup>16</sup>

Most commonly used identity measures saved by a dentist are:

**Photographs:** Extraoral facial and intraoral photographs taken during treatment procedures can serve an important tool of identification which can be easily reproduced and given to media for distribution throughout the area in case a child get lost/missed. The smile photographs have been widely accepted for the identification and also less time consuming.<sup>15</sup>

**Radiographs:** Radiographs most often used by a dentist to detect the pathologies and for diagnosis also aid in the identification of a child. They can reveal the anatomy of the teeth, anomalies and the treated teeth, restorations. Also the manual comparison of bitewing radiographs to reveal restored or unrestored surfaces from children may lead to matches between radiographic data from missing and deceased persons.<sup>11, 13</sup>

**Study Casts:** study casts/ models are made from the impressions of an individual's dentition. Casts help in revealing the unique features of the dentition of a particular individual such as rotations, teeth absent, structural anomalies, occlusion, etc.

These are the commonly available records of an individual that are maintained during treatment procedures which can be helpful in person identification for forensic purposes.<sup>14</sup> Apart from these, various different techniques are used for identification of a child. These are follows:

- Tooth prints
- Labeled dental fixtures
- Microdisk dental identification system
- Palatal rugoscopy
- Serial code engravement

**Toothprints:** It is an imprint of the child's dentition which is made in a softened, contoured, arch-shaped thermoplastic wafer. This wafer helps in recording individual tooth characteristics, position of tooth within the arch as well as maxilla-mandibular jaw relationship.

The bite impression concept was introduced in Massachusetts at Tufts University in 1985 and was mentored by Dr. Stanley Schwartz, former Massachusetts State Forensic Dentist and past president of the ABFO.

Buchner, 1985, stated that recovery of only a single tooth or jaw fragment might be enough to confirm a positive

identification. Clearly, a digital image of a tooth taken in this thermoplastic impression material, with resolution of 25-50 microns, showing the characteristic cusps, grooves, and ridges, would certainly enhance the opportunity to confirm an individual's identity. If the teeth further had a sealant or restoration placed, the margins would present further individuality from one person to another<sup>4</sup>.

Toothprint kit includes:

- 2 thermoplastic wafers
- Gloves
- 2 sealable storage bags

**How to take toothprints ?** The thermoplastic wafer is softened in hot water (145° F) and then the child bites on the wafer for about 50s. After 2-3 min of cool down period, the bite impression is ready. It is then hand over it to child's parents in a plastic bag.

The dental characteristics are recorded at retake schedule:

- Initial Impression -age 3 yrs
- Second impression- age 7 - 8
- Final impression -age 12 - 13

Toothprints is an arch-shaped dental impression on a thermoplastic wafer. This can be taken either by a dentist, or it can be done at home (Banks, 2002).

Just as fingerprints are unique to every person, and parents are often encouraged to keep their child's fingerprints on hand for emergency identification, dental imprints are utterly individual. Toothprints are helpful as they are unique to every person, so serve an accurate method of identification. Their unique feature is that it can capture saliva which is a powerful source of the human scent and hence it helps in tracking the missing children. DNA sample can also be extracted from saliva.

Research has shown that saliva captured on a thermoplastic bite impression and stored at room temperature has produced a nuclear DNA genetic profile almost three years after the bite impression was taken.

One comment on scent dog tracking: research by a leading authority using German Shepards and Bloodhounds found that the dogs had no difficulties or problems readily tracking off thermoplastic bite impressions eight months after the bite impression was taken on a five-year-old boy. It is expected that 'Toothprints' will be shown to provide a scent source for tracking children for the period of time between recommended periodic retakes of bite impressions.

In comparison of thermoplastic bite impressions with bite marks (the markings of anterior teeth in skin and foodstuffs), a thermoplastic bite impression records up to 3 millimeters of tooth characteristics in a thermoplastic material, which has been shown to be more accurate than alginate.

**Labelled Dental Fixtures:** The main methods of marking denture are:<sup>10</sup>

- The surface method
- The inclusion method

Inclusions methods are permanent if compared to surface method but require more skills and are also time consuming.<sup>5</sup>

It can be used in cases of removable and fixed appliances. In the surface marking method, “scribing or engraving” is done on the denture itself to locate the marks on one of the denture’s surface. In this technique, letters, or numbers are engraved with a small round dental bur on the fitting surface of the appliance. The disadvantage of this method is that engraving can result in food lodgement leading to bacterial infection.

There’s another technique known as “embossing” in which initials and surname of the patient is scratched on the master cast using a dental bur. This technique produces embossed lettering on the fitting surface of the denture. This can also result in continued tissue irritation and has been associated with malignancy, and hence may not be an ideal method for denture marking. This can be prevented by covering the embossed marking on the denture framework with the denture base acrylic and process it to a finished state.

The marks in inclusion methods are made using metallic or nonmetallic materials, microchips and micro labels. These are then enclosed in the denture at the packing stage but the main disadvantage is that a dislocation, wrinkling, or tearing can occur sometimes. Labeled Dental fixtures is a very successful method of identification in forensic investigation.

*Microdisk dental identification system*<sup>8</sup>: A more permanent method of personal identification is the use of intraoral micro-identification discs . A wafer of plastic or metal with a surface area of 2.5 to 5 mm<sup>2</sup> which carry identifying numbers or letters (indicia) is used. This plastic or metal wafer is bonded to the buccal enamel surface of the posterior teeth

Mylar type plastic or stainless steel blanks can be used for the fabrication of microdisc bases with an internal sandwich containing the photo-reduced indicia. Metal discs are etched or engraved using a computer driven YAG laser for the marking and then the disc is attached by conventional etching and bonding techniques to the enamel surface. These are typically bonded to the buccal surface of the maxillary first permanent molar or the second primary molar. Clear composite material is then applied to cover the disc for the prevention of degradation of the indicia by salivary contamination.<sup>6</sup>

**Palatal Rugoscopy:** Palatal rugoscopy is the study of patterns of rugae which are irregular, asymmetric ridges of the mucous membrane present on the hard palate extending laterally from the incisive papilla and the anterior part of the palatal raphe. The rugae were depicted using a sharp graphite pencil and recorded. Based on the length of all the rugae, there are 2 categories<sup>7</sup>:

- Primary rugae: more than 5 mm
- Secondary rugae: 3–5 mm.

Considering the shapes of individual rugae there are classified into 4 major types: curved, wavy, straight, and circular.

Palatal rugae have been equated with fingerprints and are unique to an individual and their overall stability also suggest their use for forensic identification.<sup>9</sup>

*Serial code engraving:* This is a method of engraving a code number in the child’s permanent teeth which can be revealed only after an x-ray.

The information about the tagged individual (name, age, date of birth, etc.) is placed into its computer database by a company named Trudent systems Inc (TDS-U.S.A). When a person is reported missing , the code number is published bimonthly in dental magazines that reach >140.000 dental offices in the USA and Canada. As long as the individual remains missing, the company will continue to publish the codes. When a code is detected during a routine dental X-ray, the dentist should check the published codes or contact the company. If it corresponds to a missing person, the dentist should inform the law enforcement agency, the police and the company (TDS). The police in collaboration with TDS will inform the child’s parents. If the child lives in another country, the Interpol should be informed.<sup>1,16</sup>

It is done using metallic materials, microchips, micro-labels and non-metallic materials. These are inserted using photochemical etching procedures similar to procedures of filling compounds.

## CONCLUSION

A detailed dental record maintained at normal routine appointments can provide great information in finding the missing children. These are the painless procedures which can be easily done at the dental office and are updated regularly. Parents can take help from the dentists to make sure the safety of their child by keeping these simple records which can be of great help in case a child is reported missing.

## REFERENCES

1. Stavrianos C, Kafas P, Katsikogiani G, Tretiakov G, Kokkas A. Contributing in the identification of missing children: The dentist's role. Res J Med Sci 2010;4(3):128-35.
2. National centre of missing and exploited children; <http://www.missingkids.com/KeyFacts>
3. <http://timesofindia.indiatimes.com/india/One-lakh-children-go-missing-in-India-every-year-Home-ministry/articleshow/39779841.cms>
4. Tesini DA, Harte DB, Crowley K. Dentistry's role in identification of missing and unknown children: update on the dental bite impression technique; J Mass Dent Soc. 1999 Summer;48(2):29-34, 50.
5. Policy on Child Identification Programs, ORAL HEALTH POLICIES, American Academy Of Pediatric Dentistry, 2012
6. David A. Tesini; Overview of the Use of Toothprints

- Thermoplastic bite impressions to Aid in Dental Identification, DMD, April, 2005
7. Rajendra K. Baad et al , 2015 Proposing national identification number on dental prostheses as universal personal identification code–A revolution in forensicodontology, Journal of Forensic Dental Sciences. May-August 2015 ;7(2).
  8. Hansen RW, Intraoral micro-identification discs, The Journal of Forensic Odonto-stomatology ;1991, 9(2):76-85.
  9. Aparna Paliwal, Sangeeta Wanjari, Rajkumar Parwani, Palatal rugoscopy: Establishing identity, Journal of Forensic Dental Sciences ;January-June 2010 2: 1.
  10. Mohan J, Kumar CD, Simon P. "Denture Marking" as an aid to forensic identification. J Indian Prosthodont Soc 2012;12:131-6.
  11. Fridell S, Ahlqvist J. The use of dental radiographs for identification of children with unrestored dentitions. J Forensic Odontostomatol 2006;24:42-6.
  12. Charangowda BK. Dental records: An overview. J Forensic Dent Sci 2010;2:5-10.
  13. Chandra Shekar BR, Reddy CV. Role of dentist in person identification. Indian J Dent Res 2009;20:356-60
  14. Shanbhag VK. Significance of Dental Records in Personal Identification in Forensic Sciences. J Forensic Sci Med. 2016;2:39-43
  15. R.F. Silva, S.D. Pereira, F.B. Prado, E. Daruge (Jnr.), E. Daruge, forensic odontology identification using smile photograph analysis – case reports , (J Forensic Odontostomatol 2008;27:1:12-17
  16. Bell GL, Dentistry's role in the resolution of missing and unidentified persons cases; Dent Clin North Am. 2001 Apr; 45(2):293-308.

Source of Support: Nil  
Conflict of Interest: Nil