

Identification of Deceased Children of Nepal Airlines Crash through Dental Age Estimation

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ABSTRACT

Identification of victims in a disaster is a challenging process and requires use of both primary and secondary identifiers. Development of teeth is one of the routinely used methods of age estimation and helps in establishing deceased biological profile. Two children who lost their lives in 2014 in Nepal Airlines crash, were looked for the dental developmental status. One of the children had primary dentition, while the other had mixed dentition. This helped us in estimating age of these individuals reconciled with the chronological age provided by the relatives. This led to the identification of both the children, thus, emphasizing teeth as important means of identification in any disaster.

Keywords: dental age; dental identification; disaster victim identification; forensic dentistry; forensic odontology.

INTRODUCTION

Identification of a deceased is essential in terms of legal, ethical, religious and social aspects.¹ This is done by establishing a biologic profile; age estimation being one of the important aspects in this process of identification.² Development of dentition is one of the routinely used methods of age estimation.³

On 16th February, 2014, Nepal Airlines Flight 183 crashed in Arghakhanchi district, Nepal claiming 18 lives. The flight was scheduled from Pokhara airport to Jumla airport. Among the dead were two children. The dead bodies of the children along with other victims were brought to Kathmandu Autopsy Center, Department of Forensic Medicine, Institute of Medicine for Identification.

CASE REPORT

Forensic Medicine team carried out the post-mortem examination of the bodies of these children, followed by post-mortem dental examination by the forensic dentists. These bodies were assigned a unique identification number. Both the bodies were photographed with all

the personal clothing. The personal belongings were removed and photographed. The details of belongings were noted in the post-mortem INTERPOL DVI forms.

The personal details of these children were made available by the airlines company in co-ordination with their respective family members. One of the children was aged 4 years and the other aged 8 years.

On post-mortem dental examination, one of the bodies had only primary teeth erupted. All twenty primary teeth were present in the oral cavity without any signs of eruption of permanent first molar, in any of the quadrants. Based on these erupted teeth, the age of the victim was estimated to be between 2 to 6 years. Figure 1 shows the presence of primary teeth in upper anterior region of 1st child, in contrast to the permanent teeth present in the same region in 2nd child (Figure 2).

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Figure 1. Showing Primary anterior teeth.



Figure 2. Showing permanent teeth; 11 and labially erupting 22, and socket of 21.



Figure 3. Showing mixed dentition in lower right quadrant (permanent incisors and 1st molar, primary canine and molars).

The second body showed presence of both primary and permanent dentitions. Primary teeth present were 55, 54, 53, 63, 64, 65, 75, 74, 73, 83, 84, 85. The permanent teeth present were 16, 11, 22, 26, 41 and 42. 31 and 32 were noted as missing post-mortem. Permanent teeth 11, socket for 21 (missing peri-mortem), and 22 erupting labially can be seen in (Figure 2.) Presence of both primary and permanent teeth in lower right quadrant can be seen in (Figure 3.)

The teeth have been represented in Federation Dentaire Internationale (FDI) notation. Based on this mixed dentition period, the age of the patient was estimated to be 8 to 11 years.

Reconciliation was carried out by matching the victim's estimated age and the chronological age of the victims as provided by the family members.

DISCUSSION

A disaster is an unexpected event resulting in significant loss of property and human lives. It can be related to human activity or natural events.⁴ A disaster can be classified into open type, closed type and both.⁵ In a closed disaster, the probable list of victims involved is known, whereas there is no record for the number or name of the people involved in an open disaster. This was a case of closed disaster, where the information of the involved victims was recovered from the flight manifest.

Victims in a disaster are identified by primary and secondary means. Fingerprints, dental comparison and DNA are considered to be primary identifiers, as they provide scientific basis for any identification. Secondary identifiers like clothing, jewelry, tattoos etc. should be used only to support other means of identification.⁵ Identification based on comparison of dental data, has been considered to be reliable and precise.⁴ In a previous incident of air crash in Nepal, most of the victims were identified by dental comparison.⁶

The tooth being the most resilient structure in human body, can resist changes due to extreme temperatures or excessive physical forces. Thus, teeth are considered to be useful in identification in mass disasters.⁷

The visual identification of the body was not considered in this disaster as there was distortion in the face because of heavy impact. Moreover, visual identification is error prone, and has been shown to result into erroneous identification of Mangalore flight crash victims.⁸

Eruption timings of teeth were useful in distinguishing two children from each other. One of them had only deciduous teeth erupted, and the other one had mixed

dentition. This allowed us in assigning an age to the child with only deciduous teeth to be less than 6 years, and the other child to be around 10 years. Age estimation is considered as a vital component in identification of victims of limited-population fatal incidents, and yields higher accuracy in growing individuals.⁹ Dental development is considered as a reliable age assessment parameter, as it is least influenced by environmental disturbances.¹⁰

The accuracy of dental identification is dependent on the quality and accuracy of the dental records.⁴ However, in cases of children, development of dentition

can be used to estimate age in order to assist in the identification process as described for these cases.

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Conflict of Interest: None.

Consent: JNMA [Case Report Consent Form](#) was signed by the patient and the original is attached with the patient chart.

REFERENCES

1. Dagalp R, Aka PS, Canturk N, Kedici I. Age estimation from fetus and infant tooth and head measurements. *Int J Legal Med.* 2014;128(3):501-8. [[PubMed](#)]
2. Dedouit F, Saint-Martin P, Mokrane FZ, Savall F, Rousseau H, Crubezy E, et al. Virtual anthropology: useful radiological tools for age assessment in clinical forensic medicine and thanatology. *Radiol Med.* 2015;120(9):874-86. [[PubMed](#)]
3. Franklin D. Forensic age estimation in human skeletal remains: current concepts and future directions. *Leg Med.* 2010 Jan;12(1):1-7. [[PubMed](#)]
4. Kolude B, Adeyemi BF, Taiwo JO, Sigbeku OF, Eze UO. The role of forensic dentist following mass disaster. *Ann Ib Postgrad Med.* 2010;8(2):111-7. [[PubMed](#)]
5. Balla SB. Forensic Dental Identification: Practice in Indian Context Compared to Western Countries. *J Forensic Sci Med.* 2016;2(1):44-7. [[Full Text](#)]
6. Dahal S, Agrawal NK, Shrestha PK. Role of dentists in disaster victim identification of Sita air crash, Nepal. *J Inst Med.* 2014;36(2):97-101. [[Full Text](#)]
7. Rajshekar M, Tennant M. The role of the forensic odontologist in disaster victim identification: A brief review. *Malays J Forensic Sci.* 2011;5(1):78-85. [[Full Text](#)]
8. Nandineni MR, Prasad SPR, Goud CV, Negi DS, Nagaraju J, Gowrishankar J. DNA – based identification of victims of the Mangalore air crash of May 2010. *Curr Sci.* 2010; 99:341-2. [[Full Text](#)]
9. Alshihri AM, Kruger E, Tennant M. Dental age assessment of Western Saudi children and adolescents. *Saudi Dent J.* 2015;27(3):131-6. [[PubMed](#)]
10. Cardoso HF. Environmental effects on skeletal versus dental development: Using a documented subadult skeletal sample to test a basic assumption in human osteological research. *Am J Phys Anthropol.* 2007;132(2):223-33. [[PubMed](#)]