

## Review of cases involving forensic odontology and its relevance in world statistics: an original study

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**Abstract :** Forensic odontology usually involves the cooperation & coordination of law enforcement officials, forensic pathologists, forensic odontologists, forensic anthropologists, serologists, criminalistics, & other specialists. This branch of dentistry helps the law in solving crimes by various methods of dental investigation which includes radiographic investigation, human bite marks analysis, anthropologic examination and during mass disasters. It has helped in solving cold cases and plays a vital role in solving cases in court of law. The present study was done to analyze the importance of forensic odontology in India and its relevance in world statistics. The prevalence of using forensic odontology worldwide is very minimal when compared to forensic medicine. Thus, practitioners must be aware of the importance of forensic dentistry & should also maintain premortem dental record, which is a useful tool & help legal authorities during an identification process.

**Keywords:** Crime Cases, Dental identification, Forensic Odontology,

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### I. Introduction

Forensic Odontology is a branch of dentistry which utilizes dental or oro-facial findings to serve the judicial system. This also helps in isolating samples from the biological material such as blood, semen, hair roots, tissue, teeth, bone, and saliva using DNA analysis.<sup>1</sup> The first documented case of forensic odontology was the identification of Lollia Paulina, in the year 49 A.D.<sup>2</sup> First case of identification using dentition from India was M. Raja Jayachandra Rathore of Canouj, died on the battlefield. The body was identified by his false anterior teeth.<sup>3</sup> The teeth being the hardest structure in the human body provide a diagnostic aid in the identification of individuals. Teeth can survive in most of the conditions during death and decomposition and when the body is exposed to extreme forces and temperature. Dental tissues resist to natural and environmental assaults such as trauma, incineration, immersion, mutilation and decomposition and provide excellent source of dental material. This provides a useful aid in cases of failure of methods of conventional dental identification.<sup>4</sup> The prime aim of forensic odontology is to identify human remnants through various investigatory methods such as dental records, age determination and specific gender for dental evidence in the court. It is also useful in investigation of marital and criminal cases and individual identification of longer duration. Various methods of investigation in forensic odontology are dental identification such as dental pathology, restorations, dental anomalies, bite marks investigation, cheiloscopy and rugoscopy.<sup>5</sup> Forensic odontologists help legal authorities and prepare dental evidence by management and maintenance of dental records which contain all legal documents for unique dental information, identification of human remains and compare ante mortem and postmortem dental information, collecting and analyzing bite marks on inanimate material or injured tissue, presenting dental evidence as an investigatory aid in identification, bite mark, human abuse, malpractice, fraud and personal injury cases, assessment of age and sex of the person.<sup>6</sup>

The dental record contains legal document and contains subjective and objective information about the patient. Physical examination of the dentition and supporting oral and surrounding structures must be recorded. In addition, clinical laboratory tests, study casts, photographs and radiograph results and should be kept for 7-10 years. Pediatric dental patients' records should be retained until the patient reaches the age of maturity.<sup>7</sup> The present study was done to review cases involving forensic odontology and its relevance in world statistics.

## II. Materials And Methods

An online Medline search of retrospective medico-legal cases was done. Total 300 individual cases from 1400AD to 2017 were taken from online search and data is collected, which is consisting of age, sex, type of crime and forensic reports were analyzed and tabulated. The retrieved individual case files were examined and data pertaining to forensic dentistry were identified and recorded. The values obtained were examined using Microsoft excel and graphs were plotted.

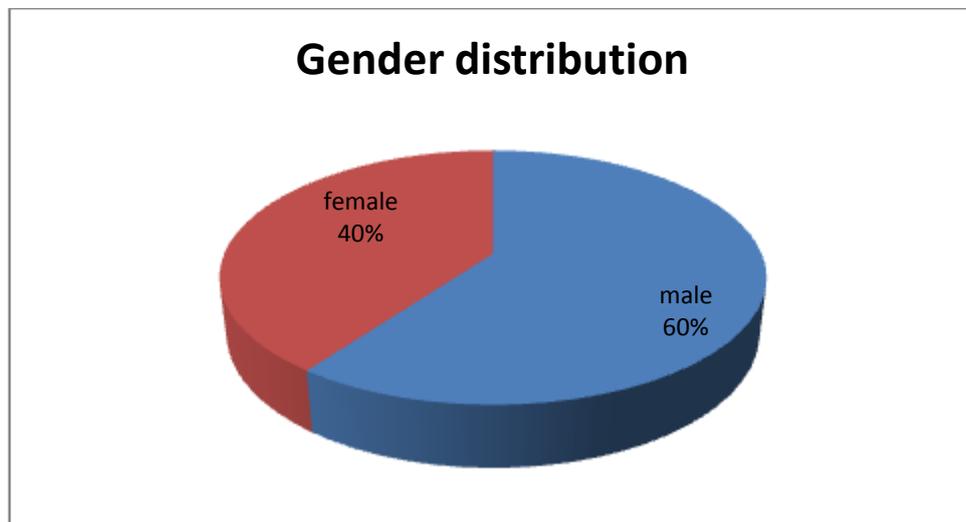
## III Result

A trial of 300 cases were searched and analysis were made using Chi-square test and bar graphs were plotted, as follows:

### 1) Distribution of sex (Fig 1)

In this study 60% of the cases belongs to male and remaining 40% cases belongs to female.

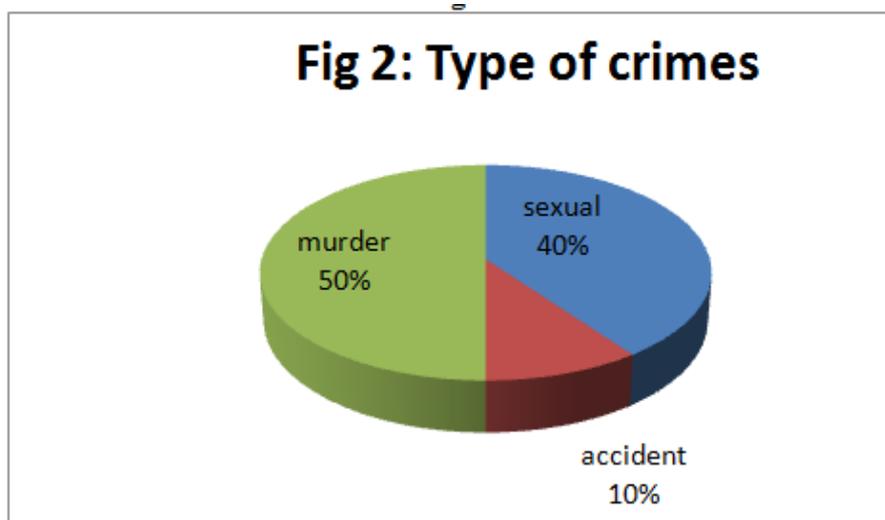
Fig 1



### 2) Type of death and crimes (Fig 2)

40% cases were sexual assault and 10% cases were accident cases and 50% cases were criminal cases. The rest 12.14% cases were suicide.

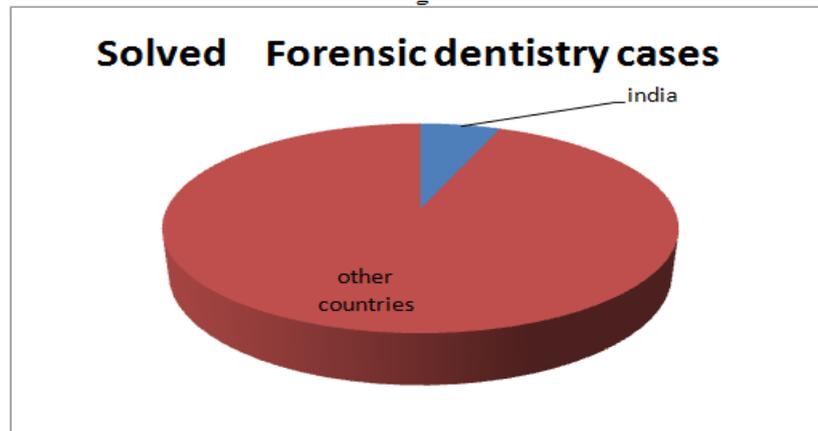
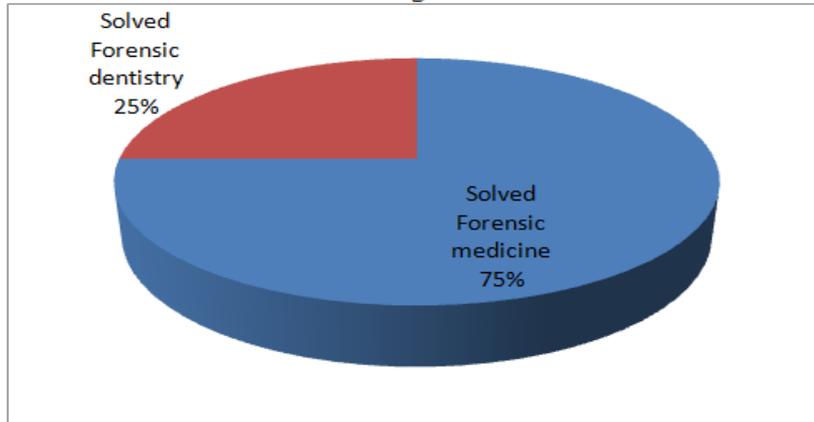
Fig 2



**3) Type of forensic report (Fig 3,4)**

Among 200 cases 150 (75%) cases were solved by forensic medicine and 47 cases (25%) were solved by forensic odontologist in world literature. In total of 48 forensic cases which were solved by forensic odontology only 2% case were solved in India.

**Fig 3**

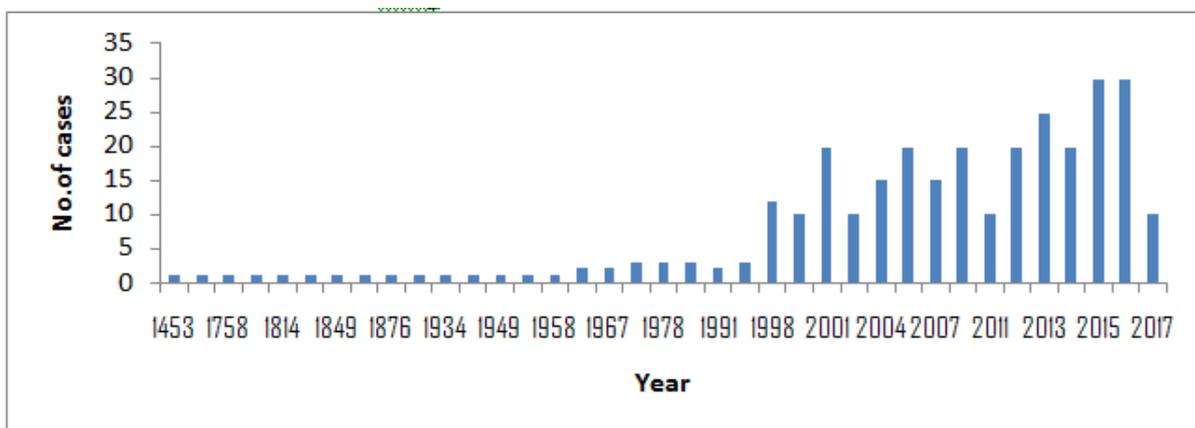


**Fig 4**

**4) Total no of Cases (Fig 5)**

According to our study the data collected from the medline search included solved cases in forensic medicine and forensic odontology from the year 1453-2017. Least number of forensic medicine and forensic odontology cases were solved from the year 1453-1998. Moderate no of cases were solved from the year 2000-2012. Highest number of cases were solved from 2013-2017.

**Fig 5**



#### **IV. Discussion**

This retrospective Medline search was done to review cases involving forensic odontology and its relevance in world statistics. Total 300 individual cases from 1400AD to 2017 were taken from online search and data is collected, which contained data like age, sex, type of crime and forensic reports were analyzed and tabulated.

The retrieved individual case files were examined and data pertaining to forensic dentistry were identified and recorded. The values obtained were examined using Microsoft Excel and graphs were plotted. In this study 60% of the cases belonged to male and remaining 40% cases belongs to female(Fig 1). 40% cases were sexual assault and 10% cases were accident cases and 50% cases were criminal cases, rest 12.14% cases were suicide (Fig 2). Among 200 cases 150(75%) cases were solved by forensic medicine and 48 cases (24%) were solved by forensic odontologist in world literature (Fig-3). In total of 48 forensic cases were solved by forensic odontology. Only 2% cases were solved in India (Fig-4).

According to the study conducted by Sengupta et al only 4% of the dentists have contributed in identification of victims in mass disasters the same percentage of subjects had contributed toward solving cases related to forensic odontology. From the study conducted by Shetty and Raviprakash et al only 7% of study participants had formal training in forensic odontology. Ramandeep and Gurminder et al conducted a systematic review on the knowledge, awareness, and practice of forensic odontology among dentists in India.<sup>8</sup> A recent survey conducted by Acharya et al reveals that 86% of dentists in India maintain dental records.<sup>9</sup> The knowledge and awareness level regarding forensic odontology among the subjects were inadequate and there is significant variation in practice and management in different studies. According to our study the data collected from the medline search included solved cases in forensic medicine and forensic odontology from the year 1453-2017. Least number of forensic medicine and forensic odontology cases were solved from the year 1453-1998. Moderate no of cases were solved from the year 2000-2012. Highest number of cases were solved from 2013-2017. (Fig -5)

This retrospective Medline study reveals that the prevalence of using forensic odontology in crime investigation in world statistics compared to India. India is far behind both in the theoretical and practical aspect of forensic odontology. The dentists should realize their role in criminal investigations so that forensic odontology may become a very useful tool in crime investigations and solve the disputed cases. It was observed that out of 300 cases only 200 cases were solved and rest of cases remains unidentified. These cases would have been solved with the help of forensic odontology if they had proper ante-mortem and post mortem records. If the body is in a state of advanced putrefication or damage then identification can be made upon dental finding. It is responsibility of the government and local administrators to make the most of such services by passing regulations that will ensure the use of teeth in post-mortem identification. In India, we have no institutions which help in studying about forensic odontology & due to lack forensic odontology trained person.

#### **V. Conclusion**

It was concluded from the present study that the prevalence of using forensic odontology worldwide is very minimal when compared to forensic medicine. 44% of crime cases are closed as unidentified person. There is an urgent need to explore the knowledge about forensic odontology in routine practice by organising workshops. It is vital that a person interested in forensic odontology should be properly educated and trained. Dental practitioners also should have knowledge about the applications in forensic odontology. Dental records should help the legal authorities and provide a useful tool during identification process. It is accepted as a dental specialty in many developed countries but it's importance is not recognised in developing countries like India which is far behind regarding theoretical and practical aspects of Forensic dentistry is yet to be included in routine investigative procedures in many developing countries. Government, investigative agencies and health care professionals play a vital role in educating the general population regarding the importance.

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