

## **"An Insight into the Awareness and Utilization of "Dental Evidence" Among the Police Force in Greater Noida"**

**Dr. Ekta choudhary<sup>1</sup>, Dr. Anu Vashisht<sup>2</sup>, Dr. Aashima kulshreshta<sup>3</sup>, Dr. Priya Jain<sup>4</sup>,**

**Dr Sachin Chand<sup>5</sup>, & Dr Kuldeep Dhanker<sup>6</sup>**

<sup>1</sup>Professor and Head of department, Department of conservative Dentistry and Endodontics School of Dental sciences Sharda university

<sup>2</sup>Assistant Professor, Department of conservative Dentistry and Endodontics

School of dental sciences Sharda university

<sup>3</sup>Second year Post graduate, Department of conservative Dentistry and Endodontics

School of dental sciences Sharda university

<sup>4</sup>Second year Post graduate, Department of conservative Dentistry and Endodontics

School of dental sciences, Sharda university

<sup>5</sup> Associate Professor, Public Health Dentistry, SGT Dental College, Hospital & Research Institute, SGT University, Gurugram

<sup>6</sup>Assistant Professor, Public Health Dentistry School of Dental sciences

Sharda university

### **ABSTRACT**

In our country, where FO is still in its early phase, it becomes a necessity to educate and aware the crime investigating officers and their team with the tools of forensic dental science and protocols that are to be followed. This would help them to identify, recover, and interpret the dental evidence correctly, thus providing timely justice to all. This questionnaire-based study is pursued with the following objectives that were assessed in the study among police officials in Punjab.

**KEYWORD:** Forensic Odontology ( FO ), dental evidence , police officials

### **INTRODUCTION:**

It is rightly said,

*"Each human has right to justice"*

But often due to lack of evidence and lack of effort justice gets denied. Forensic Odontology a branch of Forensic sciences that uses the skill of the dentist for personal identification at the time of mass calamities, sexual assault and child abuse and many more <sup>[1]</sup>. Forensic odontology involves proper examination, handling, and evaluation of dental evidence, which is presented in the interest of justice <sup>[2]</sup>.

Incidences of brutal rapes, attacks by terrorists, homicides, and several natural disasters in India have

increased drastically in past few years<sup>[3]</sup>. Many of such cases have been primarily solved with the use of forensic dental evidence.

Nirbhaya rape and murder case (2015), where bite marks on victim's body were evaluated using photographs and computer-aided analysis of the bite marks to identify the suspects<sup>[4]</sup>. In Mohammad Zia-ul-Haq case, who was the sixth President of Pakistan, He died in a plane crash on August 17th 1988. Identification of his body was done by his dentition<sup>[5]</sup>.

Moreover, Indian statistics reveals nearly 2,61,779 deaths in 2008–2019 due to various natural disasters. These incidents have emphasized on the necessity to adopt a multidisciplinary approach for identifying the victims and perpetrators. The information on the individual's age, race, and gender and also sometimes cause and time of death could be ascertained by recognizing dental sample as substantial evidence by police personnel as they are the first one to take custody of investigating sites/crime scenes<sup>[6]</sup>.

In our country, where FO is still in its early phase, it becomes a necessity to educate and aware the crime investigating officers and their team with the tools of forensic dental science and protocols that are to be followed. This would help them to identify, recover, and interpret the dental evidence correctly, thus providing timely justice to all<sup>[7]</sup>. This questionnaire-based study is pursued with the following objectives that were assessed in the study by Deepti et al (2018)<sup>[8]</sup> among police officials in Punjab.

## **OBJECTIVES:**

- To evaluate the knowledge and attitude of police officials in dental evidence
- To assess the awareness about identification, collection, utilization, and interpretation of dental evidence by investigators
- To emphasize the importance of utilization of Forensic Odontology ( FO ) protocols for evidence evaluation
- To develop an awareness/training program based on the feedback.

## **MATERIALS AND METHOD:**

Ethical Clearance for conducting the survey was obtained (Ref.No.SU/SMS &R/76-A/2019/154) This questionnaire-based survey was conducted by the post graduate student under guidance. For sampling, Stratified technique was used, and police stations/posts in Greater Noida were covered. On duty 350 gazetted and 350 non gazetted police officials from Greater Noida were covered after taking their consent.

The questionnaire was formulated to evaluate approach towards utilization of dental evidence and FO science as well as awareness among the participants with total of 22 different questions (Annexure –IA & IB). Questionnaire was provided in both Hindi as well as English. The questionnaire validity was assessed in two languages (Hindi & English). The validity of the content was processed by distributing the questionnaire among experts in forensics and investigating officers.

The questionnaire was in two parts. The first section was regarding population details and the second part included questions on forensic dental evidence. A consent was taken prior from the participant (Annexure- IIA & IIB). Adequate time was provided to the participants to fill the questionnaire (10

min). Statistical evaluation was done using descriptive statistics .After completion questionnaires were used to prepare spreadsheets for data entry, and the data was subjected to analysis.

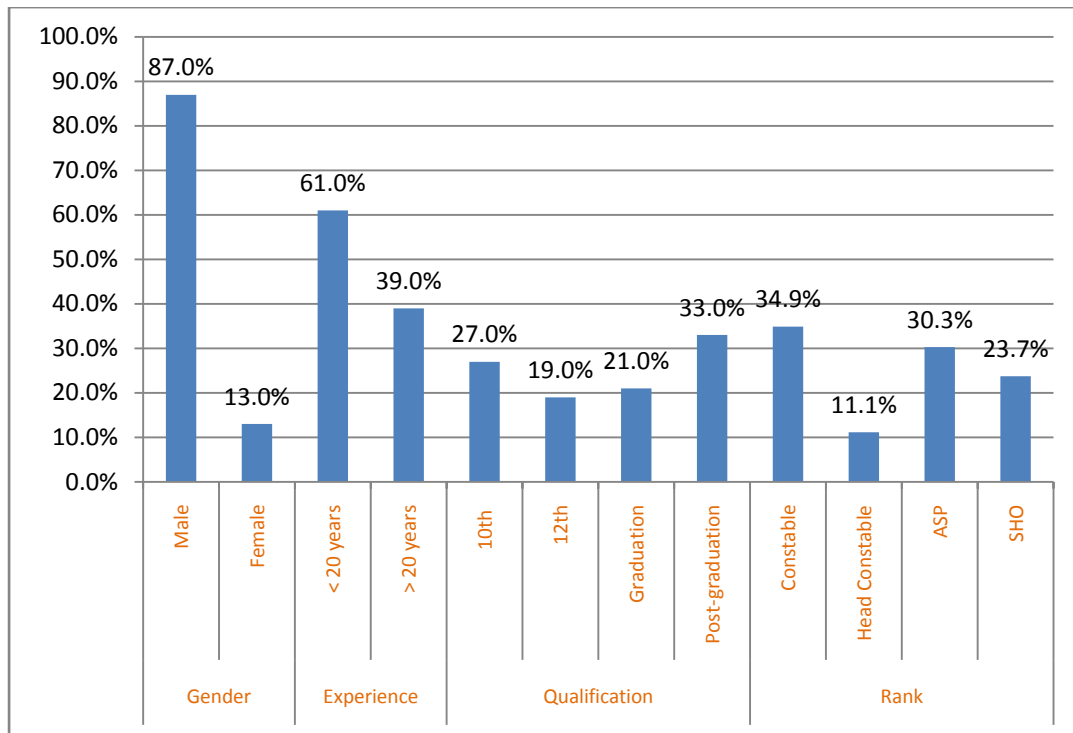
#### RESULTS:

The first half of the questionnaire obtained the demographic details of the participants including gender, rank, qualifications, and the experience. The males (87%) constituted the dominant study participants when compared to females (13%). More than half of the participants had experience of < 20 years (61%) .The constables and head constables constituted 34.9% and 11.1% of the study population, respectively.

**[TABLE 1 & GRAPH 1]**

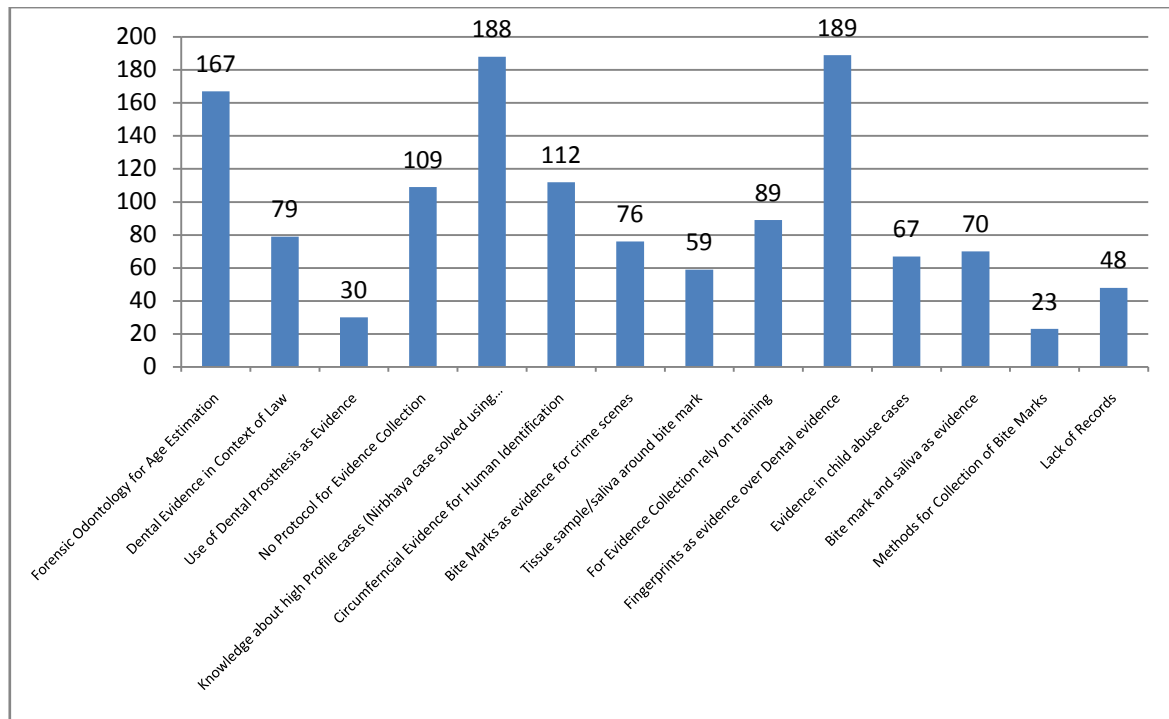
Demographic details of the participants		
Gender	MALE (87 %) 609	FEMALE (13%) 91
Experience	>20 YEARS (61%) 427	< 20 YEARS (39%) 273
Qualification	10TH 189	
	12TH 133	
	GRADUATE 147	
	POST GRADUATE 231	
RANK	CONSTABLE 244	
	HEADCONSTABLE 78	
	ASI 212	
	CP,DCP,SI,CO 166	

**TABLE 1 : Demographic details of the participants**

**GRAPH 1 : Demographic details of the participants**

PARAMETER IN QUESTION	TOTAL POSITIVE RESPONSE
Forensic Odontology for Age Estimation	167
Dental Evidence in Context of Law	79
Use of Dental Prosthesis as Evidence	30
No Protocol for Evidence Collection	109
Knowledge about high Profile cases (Nirbhaya case) solved using Dental Evidence	188
Circumferential Evidence for Human Identification	112
Bite Marks as evidence for crime scenes	76
Tissue sample/saliva around bite mark	59
For Evidence Collection rely on training	89
Fingerprints as evidence over Dental evidence	189
Evidence in child abuse cases	67
Bite mark and saliva as evidence	70
Methods for Collection of Bite Marks	23
Lack of Records	48

**TABLE 2: Significant Findings of the Study**

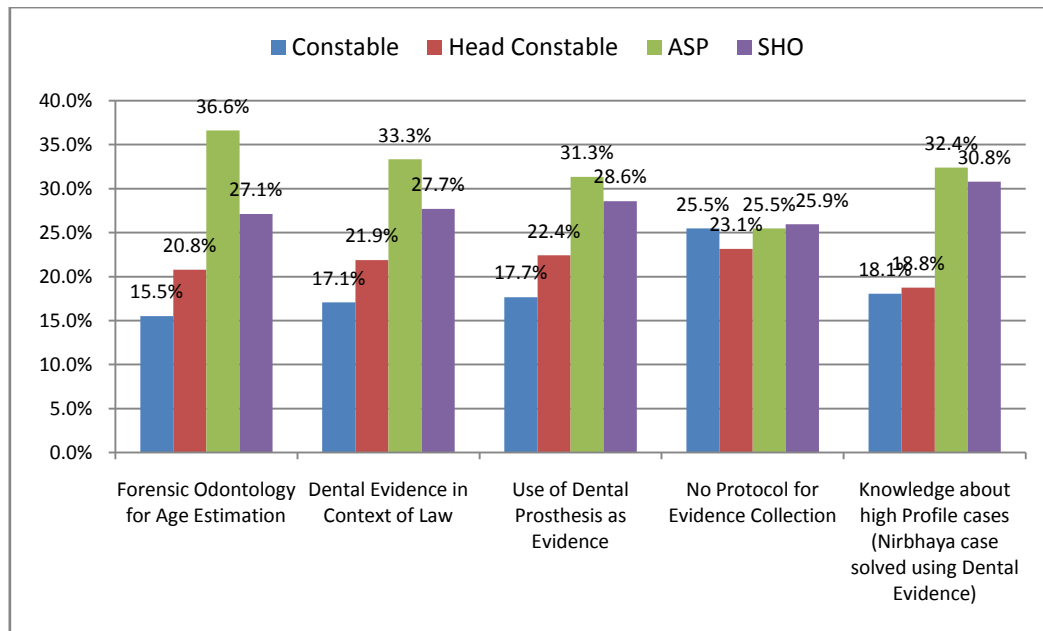
**GRAPH 2 : Significant Findings of the Study**

The Participants irrespective of their ranks have enough knowledge about the role of forensic in age estimation ( $P = 0.009$ ) with 100% response rate among gazetted officers. About 53.6% of high-rank officers had knowledge about the role of evidence in the context of law. About 38.16% mentioned Nirbhaya case, but most of them were unaware of other cases on questioning on high profile cases

	BASED ON RANK					P-value
	Constable	Head Constable	ASP	SHO	N	
Forensic Odontology for Age Estimation	88 15.5%	118 20.8%	208 36.6%	154 27.1%	568 100.0%	0.009*
Dental Evidence in Context of Law	85 17.1%	109 21.9%	166 33.3%	138 27.7%	498 100.0%	
Use of Dental Prosthesis as Evidence	89 17.7%	113 22.4%	158 31.3%	144 28.6%	504 100.0%	0.010*
No Protocol for Evidence Collection	109 25.5%	99 23.1%	109 25.5%	111 25.9%	428 100.0%	0.209
Knowledge about high Profile cases (Nirbhaya case solved using Dental Evidence)	78 18.1%	81 18.8%	140 32.4%	133 30.8%	432 100.0%	0.001*

**TABLE 3: OBSERVATIONS BASED ON THE RANK**

The positive response to questions Forensic Odontology for Age Estimation, Dental Evidence in Context of Law, Use of Dental Prosthesis as Evidence and Knowledge about high Profile cases (Nirbhaya case solved using Dental Evidence) was significantly more among ASP followed by SHO compared to Constable and Head Constable.



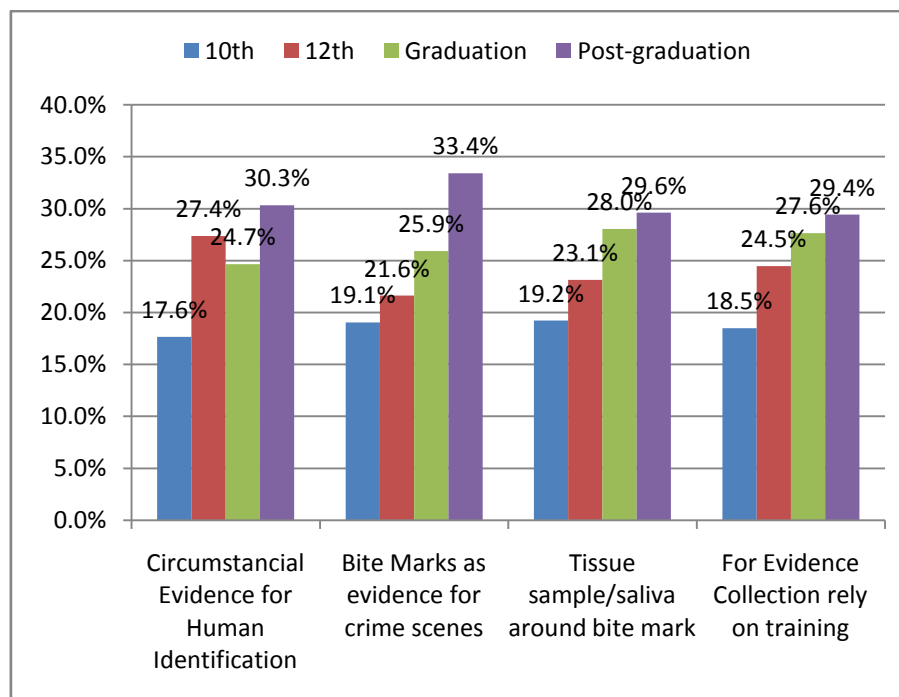
**GRAPH 3 : OBSERVATIONS BASED ON THE RANK**

	BASED ON QUALIFICATION					p-value
	10 <sup>th</sup>	12 <sup>th</sup>	Graduation	Post-graduation	Nth	
Circumstantial Evidence for Human Identification	78	121	109	134	442	0.003*
	17.6%	27.4%	24.7%	30.3%	100.0%	
Bite Marks as evidence for crime scenes	89	101	121	156	467	0.001*
	19.1%	21.6%	25.9%	33.4%	100.0%	
Tissue sample/saliva around bite mark	98	118	143	151	510	0.022*
	19.2%	23.1%	28.0%	29.6%	100.0%	
For Evidence Collection rely on training	93	123	139	148	503	0.003*
	18.5%	24.5%	27.6%	29.4%	100.0%	

**TABLE 4 : OBSERVATIONS BASED ON QUALIFICATION**

The positive response to Circumstantial Evidence for Human Identification, Bite Marks as evidence for crime scenes, Tissue sample/saliva around bite mark and For Evidence Collection rely on training was

significantly more among subjects with post-graduation followed by graduation, 12<sup>th</sup> compared to 10<sup>th</sup>.



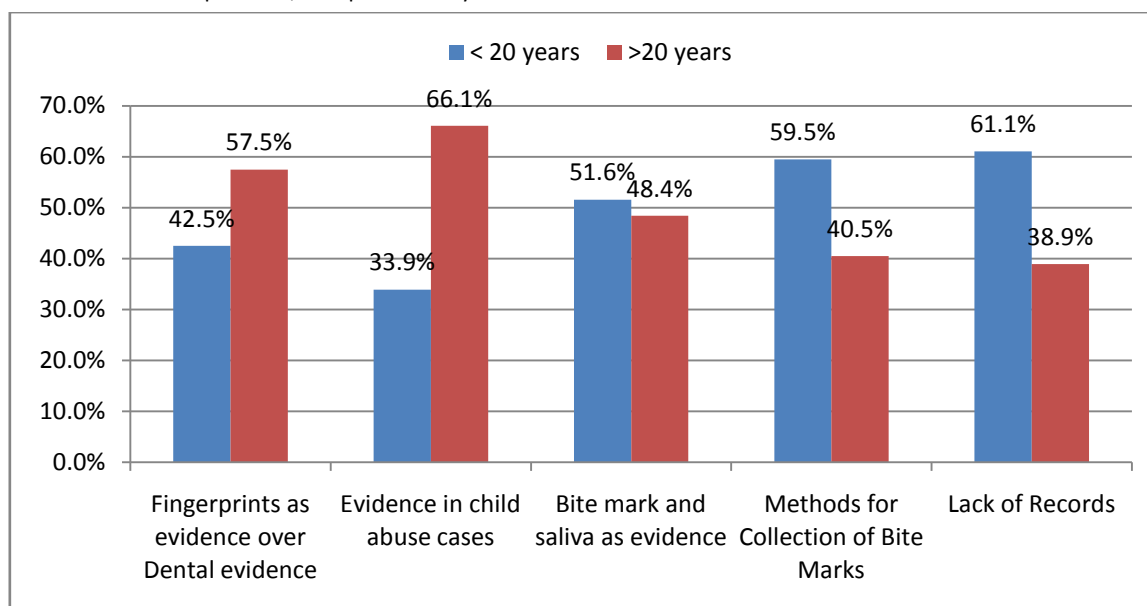
**GRAPH 4: OBSERVATIONS BASED ON QUALIFICATION**

OBSERVATIONS BASED ON THE EXPERIENCE				
	< 20 years	>20 years	Nth	p-value
Fingerprints as evidence over Dental evidence	288	389	677	0.001*
	42.5%	57.5%	100.0%	
Evidence in child abuse cases	139	271	410	0.003*
	33.9%	66.1%	100.0%	
Bite mark and saliva as evidence	176	165	341	0.009*
	51.6%	48.4%	100.0%	
Methods for Collection of Bite Marks	195	133	328	0.001*
	59.5%	40.5%	100.0%	
Lack of Records	88	56	144	0.005*
	61.1%	38.9%	100.0%	

**TABLE 5: OBSERVATIONS BASED ON THE EXPERIENCE**

The positive response to Fingerprints as evidence over Dental evidence and Evidence in child abuse cases was significantly more among > 20 years compared to < 20 years.

The positive response to bite mark and saliva as evidence, methods for collection of bite marks and lack of records was significantly more among < 20 years compared to among > 20 years.



**GRAPH 5: OBSERVATIONS BASED ON THE EXPERIENCE**

## DISCUSSION:

At the site of crime investigation, all the involved in crime investigating and especially the first responders should have an adequate understanding about the forensic process and the protocols. The priority should be to maintain the integrity of crime scene and importantly the evidence <sup>[6,9]</sup>.

Forensic odontology has also played a central role in bringing unsolved investigations to a satisfactory conclusion at many occasions. The study attempted, evaluate the knowledge, awareness and understanding of police personnel when it comes to dental evidences.

Results of our study were in accordance with study by Garg *et al.* (2015)<sup>[10]</sup> and Pandit *et al.*(2016)<sup>[4]</sup> in terms of role of police personnel at the crime site and level of understanding of forensic data. Senthil *et al.* in their study in Puducherry observed that due to ignorance or lack of awareness of officials, dental and oral findings were not properly recorded and considered that were substantial biological evidence<sup>[11]</sup>.

Proper Guidelines and protocols to be followed for collection, identification and assessing evidence by officials must be laid down that are to be followed throughout the nation as adopted and implemented by American Board of FO <sup>[12]</sup>. For the sake of mutual benefits, it is important to have positive rapport among forensic dental services and police personnel. The change has to be initiated from the basic level. For Proper collection, preservation, documentation and analysis of the evidence and also to ensure proper scientific protocols, it is necessary to have integrated approach and teamwork. <sup>[13]</sup>.

There were several limitations to our study. Being a questionnaire based study, subjective nature could be a confounding factor. Another was the small sample size of the study, although it was based on stratification.

In Majority, of the criminal cases, mass disasters or conflicts dealt by the police force are not intertwined by forensic dental experts <sup>[8]</sup>. Under such circumstances the skills of forensic odontologist could be a game changer <sup>[14]</sup>. Pandit *et al.* also emphasized the need for better interaction between the police officials and forensic odontologists <sup>[4]</sup>. The use and utilization of FO in investigating the crime for identifying victim and suspect was advocated by Mansour Al-Sarhani <sup>[15]</sup>. Rahmat *et al.* also suggested that education programs

could help in educating and spreading awareness among police officers <sup>[16]</sup>.

The study was conducted with the intention to change the perception of society, Police Department and law towards forensic dental science. The results of our study, motivates us and also others to conduct awareness camps, training sessions or programs to update knowledge and awareness.

## **CONCLUSION:**

The study focused to make the first authority at crime scene, aware of the expanding role of FO. Dental Professionals can play a prime role in highlighting and spreading awareness among the police personnel and educating them regarding the potential application of forensic evidences and use as legal evidence.

ETHICAL CLEARANCE: Annexure-III

FINANCIAL SUPPORT: Seed Fund -1902 SDS, Sharda University (Annexure -IV)

CONFLICT OF INTEREST: Nil

## **REFERENCES:**

1. K. P. Divakar. Forensic Odontology: The New Dimension in Dental Analysis. Int J Biomed Sci. March 2017; 13:No. 1
2. Avon SL. Forensic odontology: the roles and responsibilities of the dentist. J Can Dent Assoc. 2004; 70:453-8.
3. Bansal S. Which city in India is safest to live in? The Hindu; 2016.
4. Pandit S, Desai D, Jeergal P, Venkatesh S. Awareness of forensic odontology among police personnel: A new ray of hope in forensic odontology. J Forensic Dent Sci 2016; 8: 56.
5. Sansare K. Forensic odontology. Historical restorations to changes brought about by environmental perspective. Indian J Dent Res 1995; 6:55.
6. Deshpande S. Sheena Bora case: How skull-face superimposition process identified remains. The Times of India; 2015.
7. Uzabakiriho A. The role of forensic science in criminal investigation in Rwanda. Res J Forensic Sci. 2015; 3:1-4
8. Sharma, D., Koshy, G., Pabla, A., Garg, S., & Singh, M. (2018). An insight into the awareness and utilization of "dental evidence" among the police force in Punjab. *Journal of forensic dental sciences*, 10; 1:27-33.
9. Brown KA. Procedures for the collection of dental records for person identification. J Forensic Odontostomatol. 2007; 25:63-4
10. Garg Y, Bhaskar DJ, Agali CR, Garg K. Forensic dentistry: An aid in criminal investigation. Int J Dent Med Res. 2015; 1:160-3.
11. Senthil M, Kumar D, Ramu C. Prevalence of using forensic odontology in crime investigation in

- identification of individuals – A retrospective study in Pondicherry city – India. J Sci Dent. 2012; 2:19–21.
12. Metcalf RD, Klim-Lemann J. Overview of forensic odontology. J Calif Dent Assoc. 2015; 43:295–301.
13. Hinchliffe J. Forensic odontology, part 4. Human bite marks. Br Dent J. 2011; 210:363–8.
14. Jurel SK. Role of dentist in forensic investigations. J Forensic Res. 2012; 3:148.
15. Sarhani MA. Implementations of forensic dentistry in criminal investigations. Eur Sci J. 2014; 10:196–201.
16. Rahmat RA, James H, Nambiar P. Attributes of a competent forensic odontologist. Malays Dent J. 2015; 37:9–16.