

**A Select List of International Cases Involving Forensic Odontology  
(49-2013 AD)**

**By**

**Dr Chidambaram Ramasamy**

**Lecturer, Dept. of Prosthodontics, Faculty of Dentistry, AIMST University, Malaysia.**

**INTRODUCTION**

Forensic odontology is that branch of dentistry which attempts to identify unknown victims of crime.<sup>1</sup> It also contributes to the detection of crime and bringing those responsible to justice. On many occasions, dentists have played a central role in bringing unsolved investigations to a satisfactory conclusion. Forensic Odontology can utilise every dental discipline including, among others, oral medicine and radiology, oral pathology, oral and maxillofacial surgery, periodontics, prosthodontics, conservative dentistry, orthodontics and community dentistry. Forensic odontology has also played a role in the identification of multiple casualties from disasters such as earthquakes and tsunamis, mass atrocities and road accidents. The collation of ante-mortem and post-mortem dental records for unidentified victims continues to be one of the best and most frequently used methods of identification.<sup>2</sup> The following paper is a

select list of famous international cases which have involved dental forensic science ranging from 49 – 2013 AD.

## **The Cases**

### **First documented case of Forensic Odontology – 49 A.D**

The identification of Lollia Paulina, in the year 49 A.D, is thought to be the first reported case of forensic odontology. In order to maintain her personal influence at the Roman Imperial Court, Agrippina, the wife of the Roman Emperor Claudius, ordered her soldiers to kill Claudius' first wife, Lollia Paulina. Agrippina instructed the soldiers who were to kill Lollia Paulina, to bring her the victim's severed head. Agrippina recognised Paulina's head from the peculiar features of her dentition.<sup>4</sup>

### **Earliest dental identification case – 66 A.D**

Records show that, in the year 66 A.D., the Roman Emperor Nero's mistress, Sabina, was satisfied that the head presented to her on a platter was Nero's wife because she was able to recognize her black anterior tooth.<sup>5</sup>

### **First case of identification using dentition from India -1191**

In 1191, M. Raja Jayachandra Rathore of Canouj, died on the battlefield. His body was recognized by his false anterior teeth. This was probably the first case of identification using dentition from India.<sup>6</sup>

### **England. John Talbot identified by his herald - 1453**

John Talbot, First Earl of Shrewsbury was known for his bravery. In 1453, Talbot was killed in the battle of Castillon against the French. However, the Earl's body was badly disfigured by his injuries and as the French wanted to prove that the Earl was really dead, Talbot's personal herald was asked to identify his master, which he did by pointing out the body's missing left molar.<sup>7</sup>

### **Charles the Bold, recognized by his page - 1477**

Charles the Bold was Duke of Burgundy from 1467 to 1477. He perished in the Battle of Nancy, on Jan 5<sup>th</sup> 1477. His mutilated body was identified by his missing teeth.<sup>8,9</sup>

### **Colonel Sir Peter Halket – 1758**

The Battle of Monongahela was fought on July 9, 1755, during the French and Indian War (1754-1763). The commander of the 44th, Colonel Peter Halket was killed during

the battle.<sup>10</sup> His son, Major Francis Halket investigated the fate of his father and recognized his skeleton by the peculiar artificial tooth which he wore.<sup>11, 12</sup>

### **First dental identification in United States of America - 1775**

Dr. Joseph Warren of Boston was a physician and strong supporter of colonial rights during the American Revolution.<sup>13</sup> He was killed during the battle of Bunker Hill, Massachusetts, on June 17, 1775. His body was subsequently buried in a British mass grave. One year later, the people of Massachusetts wished to give a more dignified burial to Dr. Joseph Warren. His decomposed body was exhumed and identified by his dentist Paul Revere from the ivory and gold prosthesis which he had made for his friend before his death. This was thought to be the first case of identification by a dentist.<sup>14</sup>

### **Scotland, Glasgow. First case of a dentist as a professional witness – 1814**

Dr. Pattison and two Glasgow medical students were charged with the desecration of the grave of a Mrs. McAlister, who had recently been buried. The trio were accused of exhuming her body and carrying it away to the nearby College Street Medical School to be dissected for teaching purposes. In an effort to identify her dissected body, Mrs McAlister's husband produced artificial teeth worn by his late wife. Dr. James Alexander was able to fit a pivot tooth in the denture with the jaw of Mrs. McAlister.

This was considered concrete evidence in a court of law. However, as the dentures fitted other corpses equally well, the jury ordered the release of the suspects.<sup>15</sup>

### **Caroline Walsh - 1831**

On 19<sup>th</sup> August, 1831, Edward Cook and his wife Elizabeth Ross were accused of murdering Mrs Caroline Walsh, an old woman of eighty-four years of age and afterwards selling her body to anatomists, a process known as burking. Cook and Ross were brought to trial and their twelve-year-old son, Ned, became the prime witness for the Prosecution when he testified that he had seen his mother suffocating Mrs Walsh.<sup>16</sup> Matters were further complicated when an old woman, who was registered in a local poor house with the similar name of *Caroline Welsh* and fitting the victim's description, was found alive. Unfortunately, this woman died soon afterwards. The defence for the accused claimed that this person was Caroline Walsh, and thus having been found alive, proved their clients' innocence. However, despite her age, Caroline Walsh had been known to have sound upper incisors, while the recently deceased body in the poor house had lost her anterior teeth. Elizabeth Ross was convicted and hanged on Jan 9 1832. Her body was delivered to anatomists.<sup>17</sup>

### **Louis XVII: Lost King of France – 1795 (Body exhumed in 1846)**

After the King of France's execution, his heir, Louis Charles, probably died at the age of ten in Temple Prison on June 8, 1795 due to advanced tuberculosis. But there had been rumours about his death. Some people thought that the young King was still alive and insisted that the corpse of another child had been substituted at his supposed funeral. The rumours persisted. In 1846, the authorities exhumed the body under suspicion.<sup>18</sup> Dr. Recamier and Dr Milicent examined the bones and came to the conclusion that it was an individual of fifteen to sixteen years of age. Furthermore, he had a perfect dentition with his third molars erupted. This is thought to be the first recorded case to determine age by forensic examination of the teeth.<sup>19</sup>

#### **First dental evidence accepted by a law court, USA - 1849**

Dr Parkman, a professor at Harvard University was murdered in 1849. Suspicion fell on his colleague, John White Webster, a chemistry professor. On investigating Webster's laboratory, traces of mandibular bone and artificial teeth were found. Dr Nathan Cooley Keep, identified Parkman's dentures, which he had made for the deceased three years earlier.<sup>20</sup> The Parkman – Webster case was the first of its kind to be accepted by a court in the United States.<sup>21</sup>

#### **Identification of Abraham Lincoln's assassin - 1865**

On 1865, April 14, John Wilkes Booth escaped capture after the assassination of President Lincoln. After 12 days on the run, he was he was shot and killed on April 26 by a Union soldier of the 16<sup>th</sup> New York Cavalry. But there were still rumours that John Wilkes Booth had escaped arrest. To prove that he was dead, Wilke's body was exhumed and his family dentist, Dr William Merrill, identified Booth by his abnormal jaw and the gold restorations which he had made for the deceased a few days before the assassination.<sup>11, 22</sup>

### **Deception and murder: Winfield Scott Goss - 1873**

Winfield Scott Goss was a chemical researcher in Baltimore, who apparently perished in 1873, in a fire at his cottage workshop. Soon after the incident, his brother in law, William Udderzok, claimed \$25,000 on four insurance policies which Goss had taken out with different companies before his death. The insurance companies were suspicious of Udderzok and concerned that the charred body found in the ruins was not Goss, they requested the victim's dental records. The body was exhumed and on questioning, Mrs. Goss, revealed that her husband had never been to a dentist and had impeccable dentition. This confirmed the insurance companies' suspicions because the disinterred body had decayed, missing and irregular anterior teeth. Winfield Scott Goss had been in hiding. Udderzok later murdered him and was hanged on Nov 12, 1874 for first degree murder.<sup>23</sup>

### **Custer's Lost Officer – 1876**

The Battle of the Little Bighorn, commonly referred to as 'Custer's Last Stand', occurred on June 25–26, 1876, near the Little Bighorn River in eastern Montana Territory.<sup>24</sup> Henry Moore Harrington was a military officer in the U.S. 7th Cavalry Regiment who was known for his reckless bravery. He died in action at the Battle of Little Big Horn on June 25<sup>th</sup> 1876.<sup>25</sup> Although his body could not be found on the Battlefield, he was presumed dead. Army surgeon, Dr Robert W. Shufeldt, discovered Harrington's remains a year later some miles east of the main Battle site but misidentified them. In 2006, with the help of forensic scientists at the Smithsonian Institution, Henry Harrington's remains were successfully identified.<sup>26, 27</sup>

### **First dental identification in a mass disaster - 1898**

Dr Ascor Amoedo, who is considered to be the Father of modern forensic odontology wrote about the first case of dental identification in which many individuals lost their lives in a single disaster. One hundred and twenty-six members of the Parisian aristocracy were burned to death in a fire in Paris on May 4<sup>th</sup> 1897. As a result of this incident, Amoedo subsequently wrote, *L'Art Dentaire en Medicine Legale*.<sup>28</sup>

### **Pyjama Girl Case – 1934 (A mystery unsolved for ten years)**

This case attracted much public attention in New South Wales, Australia; for almost ten years, it continued to be one of the most perplexing cases of an unidentified body. In September 1934, the corpse was discovered by a local man named Tom Griffith, who lived at Howlong Road near Albury. The body was badly burnt but was still partly clothed in the remnants of a pair of pyjamas. It was agreed that the victim was a small female in her 20's but despite several investigations led by the dentist Dr Francis Jackson, the victim's identity could not be found. In court, Dr Jackson acknowledged his inexperience in forensics, and admitted that he could not identify the deceased. After ten years, the forensic evidence was re-examined by Dr Magnus, another dental practitioner. His observations matched the ante mortem dental records of Linda Agostini, a missing person. Tony Agostini, her husband was later convicted of the first degree murder of his wife in 1944 and imprisoned in Melbourne.<sup>29, 30</sup>

### **Three fingered Jack – 1935**

John Hamilton was a Canadian criminal and bank robber in 1930's. He was an associate of the Dillinger gang, earning the nickname, 'Three Fingered Jack' after having lost a couple of fingers in a sledding accident. Hamilton was arrested for various bank robberies but repeatedly escaped from prison. On April 22, 1934 Hamilton and his gang were involved in a shoot-out where he received several bullet wounds. Hamilton and the gang fled from the scene but he reportedly died at the end of April 1930. His men

buried him in Oswego. However, the FBI had received unsubstantiated reports that that Hamilton was still alive.<sup>31</sup> In August 1935, his remains were disinterred and compared with the prison dental records of Indian State Prison; the records matched.<sup>32</sup>

### **The Gray Man – 1935**

Hamilton Howard Albert Fish was a sadomasochistic serial killer in 1930's America. He was also known as 'The Gray Man', 'Boogey Man', 'Werewolf of Wysteria' and 'The Brooklyn Vampire' due to the cruel molestation of his victims which involved cannibalism.<sup>33</sup> In 1928, Fish insinuated his way into the Budd family of Manhattan by responding to an advertisement placed by one of the sons of the Family, eighteen year-old-Edward Budd, who was seeking manual work . Over a period of time, Fish gained the confidence of Edward's parents. Eventually, they allowed him to escort their ten-year-old daughter, Grace, to a birthday party. Grace Budd never returned home. On November 11, 1934, an anonymous letter was sent to Grace's parents by Fish which described the horrible murder of their daughter. The letter writer was identified as Fish from an emblem on the paper. It was now clear that Albert Fish was a dangerous psychopath. He was tracked down by Detectives and subsequently confessed to the murder of Grace Budd in a deserted house. The body parts of other victims were recovered from the murder site. Dentists Dr Well and Dr Harry Strusser, confirmed the

identity of Grace Budd from her dental chart. Fish was executed on January 16, 1936 at Sing Sing Prison.<sup>34, 35</sup>

### **British Paratrooper – 1944 (Body found in 2012)**

In 2012, the body of a World War II British Paratrooper was discovered in a field in Holland by a local man using a metal detector. The present head of the Dutch Army's 'Recovery And Identification Unit' believes that the deceased was probably a British Paratrooper who had been killed at the battle of Arnhem in 1944, falling at Ginkel Heath on Sep 18, 1944, along with 2300 troopers who landed amid fierce fighting. The man had a full dentition. It is hoped that military dental records will provide positive identification but this is yet to be confirmed.

### **Adolf Hitler – 1945**

Hitler committed suicide with his wife Eva Braun on April 30<sup>th</sup> 1945 in Berlin. It is believed that Russian forces found their remains and performed autopsies on the couple but until 1968, Hitler's fate was still a mystery. Hitler's skull fragments, lower jaw bone pieces, and upper jaw with a nine unit's bridge were retrieved from the Kremlin archives.<sup>37</sup> They were matched with the evidence submitted by dentist Hugo Blaschke, who had been Hitler's dentist since 1934. On Nov 10<sup>th</sup> 1944, Hitler had received

treatment for a severe upper molar tooth infection. Hitler's dental records and his custom made anterior bridge and periodontal problems confirmed his identity.<sup>38</sup>

### **Controversial testimony by dentist – Torgersen case – 1958**

In December 1957, the sixteen- year- old, Rigmor Johnsen was murdered in her apartment in Oslo. The teenager's wounds included human bite marks. The police suspected Fredrik Fasting Torgersen. Dr Ferdinand Strom, postulated that the bite marks on the victim's breast corresponded with Torgersen's teeth and he was convicted of the murder. Nevertheless, Torgersen continued to proclaim his innocence.<sup>39</sup> After sixteen years in prison, he was released. He sought a new trial in 1974. The Norwegian court rejected his request but permitted Professor Gisele Bang to re-examine the evidence acquired in 1957. Bang's report agreed with Dr Ferdinand Strom. Furthermore, British forensic odontologists, Professor Whittaker (in 1999) and Professor Gordon MacDonald (in 2000) acknowledged that their findings were synonymous with the former evidence. Dr Senn was requested to reopen the investigation in 2001. He was allowed to examine the physical evidence including the preserved breast tissue. Whereas the former reports were compiled using indirect examination, Dr Senn now had the advantage of direct analysis of the breast specimen. Dr Senn supported his findings with microphotography of the specimen. His report conflicted with the previous investigators. Irrespective of

the results delivered by Dr Senn, the Norwegian courts refused to grant a new trial to Torgersen.<sup>40</sup>

### **Identification of John F. Kennedy's Assassin – 1963 (Body disinterred in 1981)**

John F. Kennedy was assassinated on November 22<sup>nd</sup> 1963 in Dallas, Texas. The assassin, Lee Harvey Oswald, was captured two days later and was subsequently fatally shot by Jack Ruby. Fourteen years afterwards, the English author Michael Eddowes, claimed that the body buried in Oswald's grave was that of a Russian spy. The assassination of John F. Kennedy and murder of Lee Harvey Oswald has caused many persistent rumours. To ascertain the truth, Lee Harvey Oswald's body was disinterred; his identity was confirmed by ante mortem dental records on October 4<sup>th</sup> 1981.<sup>41</sup>

### **The First Bite – Linda Peacock – 1967**

Fifteen-year-old teenager, Linda Peacock had gone missing from her home in Biggar, Lanarkshire, Scotland on August 6<sup>th</sup> 1967. Her body was recovered the next day near the cemetery of St. Mary's Church. The deceased had two open wounds on her head and prominent teeth marks on her right breast. No incidence of rape was reported.<sup>42</sup>

Photographs were made of an odd bruise on her right breast and sent to Dr John Furness, lecturer in forensic dentistry, Liverpool. Linda had been strangled and beaten to death. The detectives began their investigation at a local, residential, approved local

school for teenaged boys.<sup>43</sup> Dental impressions were made for the residents and narrowed to five which may have caused the bites marks on the body. Suspicion lay on the seventeen- year- old teenager Gordon Hay. In court, Hay strongly rejected the suggestion that he had played any part in Linda's murder. The prosecutor responded by producing the casts of his occlusion. Hay's bite mark matched the post mortem photographs and he was charged with the murder of Linda Peacock in February 1968.<sup>44</sup> Mr. Muncie, the enquiry chief, said that this was the first time a murder conviction has relied totally on dental evidence.<sup>45</sup>

### **Vampire Rapist – Serial Killer – 1971**

Wayne Clifford Boden was a Canadian serial killer, active during the 1970's. He acquired the name 'Vampire Rapist', because of his habit of biting the breasts of his victims. These marks later proved to be prime evidence in his conviction of four brutal murders.

On 18th May, 1971, one of his victims, Elizabeth Anne Porteous, a school teacher of thirty-three years of age from Calgary, had been found dead in her apartment by her employer. She had been raped and stifled to death. Her breasts were mutilated by bite marks. The police recovered a piece of handcuff beneath the victim's body. On investigation it was found that on the night she died, she had been seen with a young, good-looking male in a blue Mercedes car with a peculiar symbol of a bull in the rear

window. As the same car was found parked near the murder scene, its owner, Wayne Clifford Boden, became the prime suspect and was taken into custody for interrogation. He admitted his affair with Porteous when the handcuff piece was produced but denied any involvement in her murder. To produce concrete evidence, the police sought the help of a forensic odontologist, to consider the bite marks on the deceased. Dr Gordon Swann, explained that there were twenty-nine points of similarity between the victim's breast and Boden's teeth. Wayne Clifford Boden was found guilty of murdering the school teacher and eventually he had to admit three previous murders as the deceased in those cases had similar bite marks. Dr Swann's evidence resulted in a sentence of life imprisonment for Boden which he commenced on Feb 16<sup>th</sup> 1972.<sup>46,47</sup>

### **Famous bite mark case - Ted Bundy, serial killer - 1978**

Ted Bundy was an American serial killer, active in 1970's, who was responsible for the rape and murder of more than thirty young women. On Jan 15, 1978 the murder of Lisa Levy and Martha Bowman was reported by a witness. Both girls had been savagely attacked and killed. Biological evidence collected from the crime scene proved inconclusive. Lisa Levy had been bitten on her left buttock and breast, which later turned out to be the important evidence in this case.<sup>48</sup> Dr. Richard Souviran, Forensic Dentist (Florida) was requested to examine the suspect and the available evidence. Ted Bundy refused to cooperate so court permission was obtained to require him to submit

to dental examination. The photographs, bite records and dental impressions which were later produced allowed Dr. Souviran to come to a conclusion that the bite marks on Lisa Levy's left buttock matched with the impressions obtained from the suspect. Ted Bundy was sentenced to death and executed at Raiford Prison in Starke, Florida, on Jan 24<sup>th</sup> 1989. The Bundy Case was the first one reported in the history of Florida which relied on bite mark evidence.<sup>49</sup>

### **Killer Clown – 1978**

John Wayne Gacy was an American serial killer and rapist who was convicted for murdering thirty-three teenaged boys and young men between 1972 and 1978 in Chicago. He was dubbed the 'Killer Clown' owing to his association with charitable events or organized birthday parties for children. On December 11<sup>th</sup> 1978, Gacy, a builder by trade, visited the owner of a pharmacy, named Phil Torf, to discuss remodelling work at his premises. Gacy questioned Torf, about his business which employed teenagers. Robert, a fifteen- year-old employee in the pharmacy store met Gacy, on Torf's instructions. Afterwards, when Robert went missing, Torf reported the boy's disappearance. Initially Gacy denied any involvement. On 13<sup>th</sup> December, a warrant was obtained to search his house where detectives found several suspicious items. Knowing that arrest was inevitable, Gacy gave a rambling confession of his crimes to a lawyer on December 20<sup>th</sup>, 1978. His actions since the disappearance of the

teenager were now scrutinised. He admitted to having buried bodies in the crawl space of his house, garage and barbeque pit, and having disposed of four more in the Des Plaines River.<sup>50</sup> Twenty-six bodies were retrieved from the crawl space - the identity of twenty-three were proved by their ante-mortem dental records. On March 30, 1980 Gacy was convicted and sentenced to death. He was executed on May 10, 1994 after he had been incarceration on death row for fourteen years.<sup>11</sup>

#### **Muhammad Zia- Ul- Haq – 1995**

Mohammad Zia-ul-Haq was the sixth President of Pakistan from 1978 until his death in 1988. He died in a plane crash on August 17<sup>th</sup> 1988. Many theories have been expressed regarding the criminal act behind his death. Thirty-one people were estimated to have died in the crash. Zia's body was identified by his dentition.<sup>4</sup>

#### **Multishooting at Port Arthur – 1996**

Lone gunman, Martin Bryant, killed thirty-two people inside a café at Port Arthur on 28 April, 1996. Later he took a hostage to an adjacent guest house, which was inhabited by a married couple. The next day, early in the morning, the house was set on fire and an unknown person was seen leaving the burning building. Bryant was arrested for the murder of the couple and charged with thirty-five life sentences and 1035 years of imprisonment. Three bodies were recovered from the burnt remains of the house. The

bodies retrieved were beyond recognition. Positive identification of the three bodies were eventually established through their dental records.<sup>51</sup>

### **Carla Terry Murder – Cold case solved after a decade (1991- 2001)**

On January 28th 1991, Carla Terry's body was found in a partially wrapped garbage bag on an abandoned road in Hartford Connecticut. Two prominent thumb marks were noticed on the victim's neck. The investigators agreed that her murderer had pressed the carotid artery and bit her breast until she became unconscious. Unfortunately some of the forensic evidence was destroyed by the paramedics who initially attended the scene. The police retrieved a card from Terry's pocket bearing the name, Alfred Swinton, who immediately became a suspect but the case went cold as the medical examiner could not associate the bite marks with Swinton. In 1998, the cold case was brought to Dr Gus Karazulas, Chief Forensic Odontologist, Connecticut State Police Forensic Science Lab. New patented image processing software called 'Lucis' was used to enhance the features of the bite mark. Karazulas devoted a couple of years to the process of associating the suspect Alfred Swinton with the bite marks on victim's breast. He was able to locate fifteen points of comparison with Swinton's teeth. In March 2001, the suspect Alfred Swinton was pronounced guilty and imprisoned for sixty years. He is also believed to be responsible for seventeen additional killings.<sup>52,53</sup>

### **Saddam's Sons - 2003**

Saddam Hussein's sons were killed by the US military on July 22, 2003 in Mosul, Baghdad. The fortified site of the confrontation was defended by a teenager and three adults; there was exchange of fire for 4-6 hours. As the result of numerous missile attacks, the bodies of the deceased were badly burned but forensic evidence revealed their identities.<sup>54</sup> Both of Saddam's sons, Uday and Qusay Hussein were positively identified from their dental records.<sup>55, 56</sup>

### **Queen Hatshepsut Mummy Mystery - 1458 BC (Mummy identified in 2007)**

Hatshepsut was the fifth pharaoh of the Eighteenth dynasty of Ancient Egypt and was considered as one of the most successful pharaohs. After her death in 1458 BC, Tuthmosis III destroyed all her monuments and defaced tombs to remove any references to her.<sup>57</sup> The British Archaeologist, Howard Carter, discovered Hatshepsut's tomb while excavating The Valley of the Kings in 1902 but her mummy could not be traced. In 1903, after careful examination, Carter discovered two damaged mummies, one of which belonged to Hatshepsut's nurse, Sitre. The unnamed mummy was still a mystery. The Egyptologist, Donald Ryan, re-discovered the tomb in 1989. In 2007, Egypt's Minister of Antiquities revised the investigation. He took advice from Galal El-Beheri,

a dentist from Cairo University, who was instructed to solve the mystery of the missing Queen Hatchepsut. A molar tooth and DNA evidence eventually confirmed that the second anonymous mummy, found with Sitre, was Queen Hatshepsut.<sup>58</sup>

**Nicholas II – Last emperor of Russia – Murder of Imperial Family – (Bodies exhumed in 1991 & 2008)**

Tsar Nicholas, was the last emperor of Russia, Grand Duke of Finland, and titular King of Poland. Following the February Revolution of 1917, he was forced to abdicate. His entire family were imprisoned initially in Alexander Palace, and later at Ipatiev House at Yekaterinburg in 1918. On July 17<sup>th</sup> 1918, Nicholas II and his family were murdered by Bolsheviks.<sup>59</sup>

In 1991, during construction work, nine skeletons were recovered in a shallow grave in Yekaterinburg, Russia. On forensic examination, it was thought likely that the skeletons were the remains of the Tsar, the Tsarina his wife, two of their children, their doctor and the three servants who accompanied and looked after them. It was also thought that the bodies of Anastasia, Alexei and Maria were missing.<sup>60, 61</sup>

Furthermore, Alexeyev (Russian Member of Academy Sciences) discovered the Tsar's dental records near the provincial museum of Yekaterinburg and found that the Tsar's teeth were badly diseased. This historical proof provided by the dental records, made it

clear that the exhumated skeletons belonged to Nicholas II and his family.<sup>62</sup> The remains were finally interred at St. Peter and Paul Cathedral in Saint Petersburg on 17 July 1998. Sergei Pogorelov, (Team member of Amateur History) discovered the remains of a young boy and woman near Yekaterinburg. The investigation was re-examined and on April 30, 2008 for forensic experts to discover whether the disinterred body belonged to the Tsar's son Alexei and his daughter, Maria.<sup>63, 64</sup>

### **Tia Sharp Murder – 2012**

Tia Sharp, a twelve- year-old school girl was reported missing from her grandmother's home in New Addington, London, in August 2012. After a week of searching, Tia's body was found in the loft of her grandmother's home. It had been wrapped in bed sheets and bin liners. Stuart Hazell, the partner of Tia's grandmother, was the last person to be seen with Tia before her disappearance. Using biological evidence, obtained from Hazell's belt and other sources, it became clear that she had been the victim of a violent sexual assault.<sup>65</sup> But as her body was badly decomposed due to the high temperature in the loft, direct identification was impossible. The schoolgirl's identity was confirmed by her dental records.<sup>66</sup> Stuart Hazell was sentenced to life imprisonment on May 14<sup>th</sup> 2013 for her murder.<sup>67</sup>

### **Misidentification of One Of Gacy's Victims – 2012**

Gacy, a building contractor and child rapist, [See above, 'Killer Clown', 1978] was convicted of enticing thirty-three teenagers and young men in Chicago and slaying them between 1972 and 1978. Around twenty-six bodies were found in his home, most were identified from their dental records. One of Gacy's victims was thought to be a young man called Michael Marino but his mother strongly disagreed with the identification of her son, as Gacy's 14<sup>th</sup> victim. She expressed the strong intuition that her son was alive and requested the body under question to be exhumed. The orthodontist, Dr Edward Palik had conducted the test in 1976 and rationalized that the dental records with evidence from the deceased.<sup>68, 69</sup> The body was disinterred in September 2011 and with new information from DNA analysis, the mother's intuition proved correct. Sherry Marino continues to believe that her son is still alive.<sup>70</sup>

### **Nirbhaya Case: Delhi gang rape – 2013**

On December 16, 2012 in Delhi, India, Nirbhaya, a twenty-three years old female was the victim of multiple rape when she was a passenger on a private bus. She was accompanied by a male friend.<sup>71</sup> Due to the severe injuries which she received in the brutal assault, she later died on Dec 29, 2012. The suspects were traced within twenty-four hours.<sup>72</sup> Six men were found guilty including a juvenile. The numerous bite marks on the victim's corpse were compared with the dental models of the accused. Dr Ashit B Acharya, (Head of forensic odontology department, Dharwad) analysed the bite

marks with the aid of computer software and postulated that two of the bite marks were identical with two suspects. The submitted evidence was approved by the court on May 6<sup>th</sup>, 2013.<sup>73</sup> One of the accused committed suicide during his trial and the juvenile was sentenced to three years imprisonment. The remaining four adults faced the death penalty.<sup>74</sup>

## **SUMMARY**

Forensic odontology is a sub-discipline of dental science which lies at the interface of dentistry and the law. Teeth are the most durable organs in the bodies of vertebrates and can therefore yield vital evidence. Dentistry has much to contribute in the detection and resolution of crime and in legal proceedings.<sup>75</sup> Dental identification is based on individual characteristics of the dentition. As positive recognition of the victim or suspect in a crime, can depend on the availability of ante-mortem dental records, it is the particular responsibility of dentists to maintain accurate records for their patients which might later become vital evidence in expensive insurance claims and most importantly, in ensuring that justice is done in courts of law.

Conflicting Interest :None declared

## **REFERENCES**

1. Avon SL. Forensic odontology: the roles and responsibilities of the dentist. *J Can Dent Assoc.* 2004; 70:453-8.
2. Acharya AB, Sivapathasundharam B. Forensic Odontology. In: Rajendran R, Sivapathasundharam B, eds. *Shafer's Textbook of Oral Pathology*. 5th edn. New Delhi: Elsevier 2006:1199–227
3. Vij K. 2nd ed. *Textbook of Forensic Medicine and Toxicology*. Churchill Livingstone, 2002. 71–2.
4. Sansare K. Forensic odontology. Historical restorations to changes brought about by environmental perspective. *Indian J Dent Res* 1995; 6:55.
5. Frness J. Cited in forensic odontology, report of bda winter scientific meeting. *Br Dent J.* 1970; 130:161–2.
6. Anil Pandey, Iqbal Singh, Sharad Pandey, Vidya. Role and responsibility of dentist as forensic odontologist. *JK- Practitioner* 2012; 17:80-2.
7. The medieval herald part 2. Heraldic jewelery. <http://www.heraldicjewelery.com> (last checked 21 June 2013)
8. Encyclopaedia britannica online. <http://www.britannica.com/EBchecked/topic/106631/Charles> (last checked 23 Nov 2013)
9. Humble B. H. Identification by Means of Teeth. *Br Dent J.* 1933; 54:528.
10. Kennedy Hickman. American revolution. Military history. <http://militaryhistory.about.com/od/americanrevolution1/p/gage.htm>
11. David R. Senn, Richard A. Weems. *Manual of forensic odontology*. 5th edn. United Kingdom: CRC Press, 2013.
12. Grady R. Personal identity established by the teeth: The dentist as a scientific expert. *Am J Dent Sci.* 17:384-405.

13. Resolved: Advances in forensic identification of U.S War.  
[http://www.medicalmuseum.mil/index.cfm?p=exhibits.resolved.page\\_07](http://www.medicalmuseum.mil/index.cfm?p=exhibits.resolved.page_07)
14. Devore DT. Radiology and photography in DNA in dental identification forensic dentistry. *Dent Clin North Am.* 1977; 21:69-84.
15. Granville sharp Pattison, friends of Glasgow necropolis.  
<http://www.glasgowncropolis.org/profiles/granville-sharp-pattison/>
16. The study: The horrific homicide of the female felon. <http://from-bedroom-to-study.blogspot.com/2012/11/the-horrific-homicide-of-female-felon.html> (last checked 12 Nov 2012)
17. Smith EJ. *The late A.S Taylor's manual.* 5th edn. London: J & M Churchill, 1905:139-141.
18. Mystery of Louis XVII. History wiz. <http://www.historywiz.com/louisxvii.htm>
19. Amoedo O. *L'Art Dentaire en Medicine Legale.* Paris: masson et Cie. 1898.
20. Fixot RH. How to become involved in forensic odontology. *Dent Clin North Am* 2001; 45: 417-26.
21. George Dilnot. *The Trial of Professor John White Webster.* Report of the case of John W. Webster. New York: Charles Scribner's Sons, 1928.
22. Marco BB. A system to assist in the identification of criminals and others by means of their teeth. *Dental Cosmos* 1898; 40:113-6.
23. Murder by gaslight: he knew too much.  
<http://www.murderbygaslight.com/2011/12/he-knew-too-much.html> (last checked 31, December, 2011).
24. Battle of the Little Bighorn.  
[http://en.wikipedia.org/wiki/Battle\\_of\\_the\\_Little\\_Bighorn](http://en.wikipedia.org/wiki/Battle_of_the_Little_Bighorn)
25. Walt Cross. *Custer's Lost Officer.* The search for Lieutenant Henry Moore Harrington, 7<sup>th</sup> U.S. Calvary. First edn. Walt Cross, 2010.  
<http://bronzestar.tripod.com/7thuscavalrycusterslostofficer/>

26. Henry M. Harrington 2nd Lieutenant 0-1, U.S. Army. Veteran tributes. <http://veterantributes.org/TributeDetail.php?recordID=264>
27. Harrington, Henry Moore (KIA- Little Big Horn), 2 LT <http://army.togetherweserved.com/army/servlet/tws.webapp.WebApp?cmd=ShadowBoxProfile&type=Person&ID=275942>.
28. Barsley RE. Forensic and legal issues in oral diagnosis. *Dent Clin North Am* 1993;
29. Brown KA. The identification of Linda Agostini. The significance of dental evidence in the Albany 'Pyjama Girl' case. A case report. *Forensic Sci Int* 1982; 20:81- 6.
30. Brown KA. The identification of Linda Agostini. *Am J Forens Med Pathol* 1982; 3:131-41.
31. John Red Hamilton, aka. Legends of America. <http://www.legendsofamerica.com/20th-gangsters-h-j.html>
32. Hamilton's fate. SAC Earl J. Connelley & others. Dusty roads of an FBI Era. <http://historicalgmen.squarespace.com/hamiltons-fate-sac-earl-j-con/>
33. Kray Kate. The World's 20 Worst Crimes: true stories of 20 killers and their 1000 victims. John Blake, 2007.
34. Albert Fish, serial killer & cannibal: Inside the grisly 1928 murder of Grace Budd. *Daily News*. <http://www.nydailynews.com/new-york/1928-murder-grace-budd-albert-fish-gallery-1.1277430?pmSlide=1#ixzz2kdbbFH1x>
35. Murderpedia. Albert Hamilton Fish. <http://murderpedia.org/male.F/f/fish-albert.htm>
36. British paratrooper's body found in Holland 68 years after battle of Arnhem. *The Telegraph*. <http://www.telegraph.co.uk/history/world-war-two/9550949/British-paratroopers-body-found-in-Holland-68-years-after-battle-of-Arnhem.html> (last checked 18 September 2012).

37. \_\_\_\_Hitler escaped myths. Justice for Germans.  
<http://justice4germans.com/2013/06/17/debunking-the-hitler-escaped-myths-forensic-evidence-trumps-rumours-theories-and-romantic-tales/> (last checked 17 May 2013)
38. Highfield, R. Dental detective work gets to the root of Hitler mystery. *Daily Telegraph*, London. October 26, 1999.
39. The Torgersen case. Fampo  
[http://www.fampo.no/fredrik\\_fasting\\_torgersen.html](http://www.fampo.no/fredrik_fasting_torgersen.html).
40. David R. Senn, Paul G. Stimson. Forensic dentistry. 2<sup>nd</sup> edn. United Kingdom: CRC Press, 2010: 316-20.
41. Norton LE, Cottone JA, Sopher IM, DiMaio VJM. The exhumation of identification of Lee Harvey Oswald. *Journal of Forensic Science* 1984; 29: 19-38.
42. Gordon Hay. British Murders  
<http://www.britishmurders.co.uk/murder-content.php?key=4814>
43. Gordon Hay. Murderpedia <http://murderpedia.org/male.H/h/hay-gordon.htm>
44. Bite marks as evidence to convict. The first bite. Crime library.  
[http://www.trutv.com/library/crime/criminal\\_mind/forensics/bitemarks/3.html](http://www.trutv.com/library/crime/criminal_mind/forensics/bitemarks/3.html)
45. Muncie W. The Murder of Linda Peacock: A triumph for Forensic Odontology. *Police J.* 1968; 41:319.
46. Serial killer central. <http://serialkillercentral.blogspot.com/2010/07/wayne-boden-vampire-rapist.html> (last checked 17 July, 2010)
47. Richard Monaco and Bill Burt. *The Dracula Syndrome*. New York: Avon Books, 1993.
48. Ted Bundy. The final bite mark.  
<https://sites.google.com/site/tedbundythelastbitemark/evidence>
49. Silver WE, Souviron RR. *Dental Autopsy*. Boca Raton. CRC Press. 2009.

50. John Wayne Gacy. [http://en.wikipedia.org/wiki/John\\_Wayne\\_Gacy](http://en.wikipedia.org/wiki/John_Wayne_Gacy)
51. Taylor PTG, Wilson ME, Lyons TJ. Forensic odontology lessons: multishooting incident at Port Arthur, Tasmania. *Forensic Sci Int* 2002; 130:174-82.
52. Adobe photoshop Connecticut police department. Forensic science lab. [http://partners.adobe.com/public/asn/en/partnerfinder/ConnecticutPoliceCS\\_Fnl\\_1](http://partners.adobe.com/public/asn/en/partnerfinder/ConnecticutPoliceCS_Fnl_1)
53. Bite marks uncover tale of murder. <http://www.ramcigar.com/news/bite-marks-uncover-tale-of-murder> (last checked 28 Feb 2011)
54. Official Story on Deaths of Saddam's Sons "Wags the dog". <http://globalresearch.ca/articles/CHO307E.html> (last checked 26 July 2003)
55. U.S: Saddam's sons identified by dental records. <http://www.smh.com.au/articles/2003/07/23/1058853098751.html> (last checked 26 July 2003)
56. Dental records prove Saddam's sons dead / Fox News. <http://www.foxnews.com/story/2003/07/24/dental-records-prove-saddam-sons-dead/> (last checked 24 July 2003)
57. Hatshepsut. About the queen, ruler or Pharaoh of Egypt. <http://ancienthistory.about.com/cs/people/p/Hatshepsut.htm>
58. Tooth solves Hatshepsut mummy mystery / world News / the guardian. <http://www.theguardian.com/world/2007/jun/27/egypt.science> (last checked 27 June, 2007)
59. Nicholas II biography. Facts, birthday, life story. <http://www.biography.com/people/nicholas>
60. Itar-tass. <http://www.itartass.ur.ru/news> (last checked 5 Dec 2008)
61. The Romanovs. Forensic identification of Tsar's grave. <http://www.exploreforensics.co.uk/romanovs-forensic-identification-tsars-grave.html> (last checked 4 November 2013)

62. Historian announces new evidence that Czar's bones really his.  
<http://www.apnewsarchive.com/1995/Historian-Announces-New-Evidence-That-Czar-s-Bones-Really-His/> (last checked 17 April, 1995)
63. DNA confirms remains Of Tsar's children. *CBS News*.  
<http://www.cbsnews.com/news/dna-confirms-remains-of-czars-children/>  
(last checked 30 April, 2008)
64. Russia's last Tsar declared victim of repression. *USA today*  
[http://usatoday30.usatoday.com/news/world/2008-10-01-583441915\\_x.htm](http://usatoday30.usatoday.com/news/world/2008-10-01-583441915_x.htm)  
(last checked 10 January, 2008)
65. Tia Sharp. The damning evidence against Stuart Hazell.  
<http://www.lbc.co.uk/photos-tia-sharp-the-evidence-against-hazell>
66. Tia Sharp latest. Body was identified by dental records because of decomposition.  
<http://www.dailymail.co.uk/news/article-2189195/Tia-Sharp-latest-Body-identified-dental-records-decomposition.html> (last checked 16 April 2012)
67. Murder of Tia Sharp. [http://en.wikipedia.org/wiki/Murder\\_of\\_Tia\\_Sharp](http://en.wikipedia.org/wiki/Murder_of_Tia_Sharp)
68. Gacy victim identity still in dispute. *Doubtful news*  
<http://doubtfulnews.com/2013/07/gacy-victim-identity-still-in-dispute/> (last checked 5 July 2013)
69. John Wayne Gacy 'Victim' Michael was misidentified; remains are of someone else: lawyers.  
[http://www.huffingtonpost.com/2012/10/26/john-wayne-gacy-victim-michael-marino\\_n\\_2022515.html](http://www.huffingtonpost.com/2012/10/26/john-wayne-gacy-victim-michael-marino_n_2022515.html) (last checked 26 October 2012)
70. Attorneys say a Gacy victim was misidentified. *USA today*.  
<http://www.usatoday.com/story/news/nation/2012/10/26/attorneys-gacy-victim-dna/1659741/> (last checked 26 October 2012)
71. IAP condoles death of Delhi gang – rape victim. New Delhi: *Zee News*. Press Trust of India.

- [http://zeenews.india.com/news/delhi/iap-condoles-death-of-delhi-gang-rape-victim\\_819606.html](http://zeenews.india.com/news/delhi/iap-condoles-death-of-delhi-gang-rape-victim_819606.html) (last checked December 29, 2012)
72. Delhi gang rape: chronology of events. The Hindu (New Delhi).  
<http://www.thehindu.com/news/national/delhi-gang-rape-chronology-of-events/article5079321.ece> (last checked September 10, 2013)
73. Nirbhaya case: Dharwad college helped with forensic analysis.  
[http://articles.timesofindia.indiatimes.com/2013-09-13/hubli/42040453\\_1\\_nirbhaya-case-delhi-police-analysis](http://articles.timesofindia.indiatimes.com/2013-09-13/hubli/42040453_1_nirbhaya-case-delhi-police-analysis) (last checked September 13, 2013)
74. Four convicted in Delhi gang- rape case.  
[http://article.wn.com/view/2013/09/11/4\\_convicted\\_in\\_Delhi\\_gangrape\\_case/#/related\\_news](http://article.wn.com/view/2013/09/11/4_convicted_in_Delhi_gangrape_case/#/related_news) (last checked January 11, 2014)
75. Ramasamy C., 'Dentistry's cardinal role in forensic odontology', *Iranian J.Publ.Health*, 2014; 43: 1152-3.





