A BRIEF HISTORY OF FORENSIC ODONTOLOGY AND DISASTER VICTIM IDENTIFICATION PRACTICES IN AUSTRALIA

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ABSTRACT

Today we consider forensic odontology to be a specialised and reliable method of identification of the deceased, particularly in multiple fatality incidents. While this reputation has been gained from the application of forensic odontology in both single identification and disaster situations over a number of years, the professional nature of the discipline and its practices have evolved only recently.

This paper summarises some of early uses of forensic odontology internationally and in Australia and discusses the development of both forensic odontology and Disaster Victim Identification (DVI) practices in each of the states and territories of Australia.

The earliest accounts of the use of forensic odontology in Australia date to the 1920's and 30's, and were characterised by inexperienced practitioners and little procedural formality. An organised and semi-formal service commenced in most states during the 1960's although its use by police forces was spasmodic. Today the service provided by qualified and experienced forensic odontologists is highly professional and regularly utilised by police and coronial services.

The development of DVI Practices in Australia began following the crash of a Vickers Viscount aircraft into Botany Bay in 1961 and, as with practices internationally, have evolved into an equally professional and reliable specialist discipline of policing in which forensic odontology plays a significant part.

(J Forensic Odontostomatol 2009;27:2:64-74)

Keywords: Disaster Victim Identification, forensic odontology, history, Australia

INTRODUCTION

Today we consider forensic odontology to be a specialised and reliable method of identification of the deceased, particularly in multiple fatality incidents. While this reputation has been gained from the application of forensic odontology in both single identification and disaster situations over a number of years, the professional nature of the discipline and its practices have evolved only recently.

This paper summarises some of early uses of forensic odontology internationally and in Australia and discusses the development of both forensic odontology and Disaster Victim Identification (DVI) practices in each of the states and territories of Australia.

While the identification of victims of mass fatality incidents (DVI) is now perceived as a sub-speciality of human identification, this has not always been the case. The development and evolution of forensic odontology identification skills in both single and multiple victim situations were inexorably linked in the beginning of the discipline. Not unreasonably, interest and advancement of forensic odontology in a given area was often linked to a disaster.

FORENSIC ODONTOLOGY AND DISASTER VICTIM INTERNATIONALLY

Histories of forensic odontology frequently refer to cases such as the identification of Lollia Paulina by Agrippina using visual recognition of 'distinctive teeth' in AD49; Charles the Bold from a missing upper tooth in 1477; General Joseph Warren by Paul Revere via a fixed wire silver bridge in 1776 and Dr Parkman by Nathan Keep from the fit of dentures on study models in 1849 as evidence of the long standing use of dentistry for identification purposes.[1-6] These cases are more accurately just serendipitous applications of dental information to identification and do not

really constitute the rigorous and reliable application of dental science that we understand to be forensic odontology today.

Strom[7] reported that the use of teeth to aid identification in the modern understanding had been proposed by Godon in 1887, but a report by M'Grath in 1869[8] described the use of dental characteristics to differentiate between two incinerated females, and a paper by Reid in 1884[9] discussed many cases using dental science for both personal identification and age assessment, one as early as 1835. Schirnding[10] noted that the *Coroners Act of 1886*, the Prussian Regulations of 1875 and Austrian Instructions of 1855 for the holding of an inquest, all contained reference to the use of teeth to establish identity.

Although it has been reported that forensic odontology was used to identify victims of a fire in the Vienna Opera House in 1878[7,11] the modern era of forensic odontology is said to have commenced with the identification of the victims of the Bazar de la Charité fire, which occurred on May 4, 1897 in Rue Jean-Goujon, Paris. One hundred and twenty six members of the Parisian aristocracy perished after an ether-oxygen film projector ignited a rapidly destructive fire. All but 30 of the victims were identified visually or by personal effects, mainly jewellery, on the day after the fire.

The honour of being the 'father of forensic odontology' is often bestowed on Oscar Amoedo, a Cuban dentist working in Paris at the time of the fire, but he did not in fact do any of the odontology work at this incident. The author of "L'Art dentaire en Medecine Legale",[12] which was an important contemporary text on many aspects of the use of teeth for legal purposes, merely reported the outcomes of the work done by other dentists after the fire. The credit for the idea of using dental information to assist the final identifications actually belongs to the Paraguan Consul, Mr Albert Haus. With the identification of the last 30 victims seeming almost impossible Mr Haus suggested consulting the dentists who had treated the remaining missing persons. One of the unidentified victims was the Duchesse d'Alencon who was a daughter of the Duke of Bavaria and sister of Elisabeth, Empress of Austria and Anne, Queen of Naples. A Dr Isaac B Davenport had provided dental services to the duchess and many of the other victims. He was apparently a trained botanist as well as a dentist and his detailed notes included excellent drawings of the dentition.[13] He examined the majority of the remaining unidentified bodies and was eventually able to identify the duchess via her dentition. Subsequently, a number of other dentists were invited to examine the remains of the deceased, and eventually all but 5 of the victims were able to be identified. The police accepted these dental identifications and released the bodies to the families.[5,6,13,14]

After the Bazar de la Charité fire many authors published case studies on the use of odontology in both single and multiple fatality incidents which indicated an increasing awareness of the value of the dentition in the identification of the deceased. Rosenbluth[15] described a murder case in the United States in 1898 where dentistry played a pivotal role. Ryan[16] mentioned the identification of US Sailors from an accident in 1927, commenting on the high quality of the dental records kept by the Navy, and Gustafson[17] recounted the identification of the 29 victims of a fire in Oslo in 1938. Simpson[18] summarised a number of English cases of the early 20th century where the use of dental evidence had been significant. Strom[7] and Gustafson[17] reported on the identification of victims of the Second World War via forensic odontology. Teare[19] discussed the identification of the 28 victims of a plane crash in 1950; Frykholm[20] described a Swedish shipping accident in 1950 where 15 were killed and Mercer, Reid & Uttley[21] and Warren[22] a rail accident in New Zealand in 1953 where 151 perished, all where dental identification made a contribution. The odontology aspects of the identification of the 118 victims of a fire aboard the SS Noronic in Toronto Harbour were described in detail by Grant, Prendergast & White in 1952.[23] While these cases provide evidence of the increased formalisation and consistency of methods of victim recovery and scientific identification practices, the use of forensic odontology was still sporadic in most countries even until the 1960's.

There does not appear to be a universally acknowledged incident which served to

initiate the development of consistent disaster victim identification practices. Strom[7] and Gustafson[24] reported that Norway is considered to have established the first Identification Committee in 1945. In the police orders of 1948 relating to this Committee the following was reported; *"In all cases where several victims are found at the same spot, the local prefect of police should appoint an identification committee consisting of three members; a police officer, a dentist and a doctor. This committee has the whole responsibility for the procedure of identification. The committee has to give a report of all details concerning the identification in relation to each body. Each single identification certificate is to be signed by all members of the committee. A body, therefore, is not considered identified unless the committee members are in complete agreement as to a positive identification. In cases of doubt the Prefect of Police should decide either whether the body is to be considered as identified or whether it should be buried as unknown. In the last event or in cases where it is impossible to establish the identity at that time, the body should not be buried until an exact description of the teeth is obtained."* This was very forward thinking for the time, and is still sound policy sixty years later as it codifies the key principles that continue to underpin DVI today. The FBI report having formed a disaster squad in 1940[25] but the identification emphasis of this group was on the use of fingerprints, although the report does mention dental charts as a '*valuable identification tool*'. With no pathologists and odontologists on the squad the DVI activities were not as comprehensive as the Norwegian model.

Several incidents served to progress the development of international standards in both DVI practices and the use of forensic odontology for identification in multiple fatality incidents. A fire aboard the S.S. Noronic in Toronto Harbour in 1949 claimed 118 lives. The investigation and DVI process employed many of the now currently recommended procedures for body recovery and identification. This incident was also the first reported use of elimination tables to simplify and add strategy to the final reconciliation process.[23]

Pedoussaut[26] reported on the identification procedures used after a plane crash in France in 1950 killed 50 people. Of particular note was the use of an identification questionnaire which applied similar reasoning to the post-mortem and ante-mortem forms now promulgated by Interpol. The presentation of conclusions in a formal identification report for each victim was also an important development. The author also commented on the potential role of the International Criminal Police Commission (later Interpol) in the coordination of the identification procedures where international victims were involved. Indeed, the editor of the journal included a draft of an international convention then being considered by the International Criminal Police Commission for the identification of victims of air accidents. This could be considered as the first attempts at drafting what are now the Interpol DVI guidelines.

The recovery and identification of the victims of the plane crash into Mt Erebus in the Antarctic in 1979 was reported as the first use of a grid reference for recording the scene and the location of body and body parts.[27, 28]

Spurred by a fuel tank explosion tragedy in Spain in July 1978, Interpol explored the need for improved co-ordination and consistency in the identification of victims of mass fatality incidents and established a working party on Disaster Victim Identification in 1982. In this incident, a road tanker carrying liquefied petroleum gas (LPG) exploded outside a camping ground during the European summer holidays, killing over 200 people from a number of countries.[29-31] Victim identification had proved difficult and highlighted the need for guiding principles that would enhance international cooperation and improve the coordination of responses to similar incidents. Interpol's working party evolved into a Standing Committee, and built on the work of Pedoussaut.[26] The Standing Committee still meets annually and a section of its agenda is devoted to analysis of case presentations, to enable practitioners to learn from the experiences of actual incident responses. The first Guide to Disaster Victim Identification was published in 1984,[32] and is now considered international best practice for disaster victim identification.[33, 34]

FORENSIC ODONTOLOGY AND DISASTER VICTIM IDENTIFICATION IN AUSTRALIA

Pounder and Harding[35] have reported that the first autopsies were conducted in Australia in 1790, one on a victim of inanition (starvation) and the other on the governor's gamekeeper who was allegedly murdered by Aborigines.

It is not really known when forensic odontology was first used in Australia. A report in the New South Wales Police News in 1943 reported the identification in Melbourne, Victoria of a murder victim, Bertha Couphlin, in 1923 and of Norman List in 1924, using dental evidence.[36] That article also mentioned that the identity of three victims of a plane crash in the Dandenong Ranges in 1938 "*could only be established by means of the teeth*". Cleland[37] mentioned the identification of a New Zealand citizen in Western Australia in 1930, although this identification appeared to rely more on circumstantial dental evidence than to be a true dental identification.

The most famous identification case from that era occurred in New South Wales in 1934. Colloquially known as the Pyjama Girl Case, the outcome highlights the value of dentistry in identification, but also the pitfalls that can derail the well intentioned but ill-prepared, both dental practitioners and investigating police officers. It involved a murdered woman who remained unidentified for 10 years, ostensibly due to unreconciled dental information. The badly burned remains of the victim were discovered by a farmer in a road culvert near Albury in September 1934. The body was clothed only in pyjama remnants and revealed little other identifying information. A post-mortem was carried out and a local dentist, Dr Francis Jackson, was asked to complete a dental autopsy. His unorthodox procedures can best be explained by his inexperience in forensic odontology, but mitigated by the fact that few people had any experience at that time. At the subsequent Supreme Court trial he admitted that this was his only experience of forensic odontology and he found the process "*revolting and unnerving"*.[38, 39]

Dr Jackson's unconventional examination occurred over three visits. On the first he made some observations and extracted two teeth, on the second he extracted an additional four teeth and on the third he took upper and lower impressions of the jaws. The extracted teeth were then mounted into the stone dental models made from the impressions "*in approximately the same position as they were in the mouth*". During the course of these examinations Dr Jackson incorrectly identified one tooth and failed to observe restorations in two other teeth. These inaccuracies proved pivotal in the inability to identify the remains for 10 years. Photographs of the casts with the extracted teeth in situ were distributed to dentists in Australia and New Zealand, and every dentist in metropolitan Melbourne and Sydney was personally contacted by police. Information about this case, including images of the extracted teeth, was also displayed as 'ads' in movie theatres. Unsurprisingly, none of these activities yielded any useful information.

The police relied on public appeals to attempt to identify the victim. Apparently over 500 women who had been reported missing were located in the course of the investigation. Ultimately the remains were preserved in a formalin bath and it became quite a social outing to visit "the body in the bath" at Sydney University. Many false identifications were offered to police from these viewings. About 9 months after the victim was found police interviewed a man, Antonio Agostini, whose wife Linda had been reported missing by a family friend. This gentleman indicated that he did not recognise the lady in the bath but provided police with the details of his wife's dentist.

The information provided by this dentist did not match the post mortem information provided by Dr Jackson and the investigation continued. Interestingly the dental information provided by the treating dentist was also somewhat unorthodox. It transpired that he kept no formal clinical records and the information he provided was an amalgamation of personal recollection and ledger entries of fees paid.

In 1944 new investigating officers decided to review all the information relating to the case and asked another dentist, Dr Magnus, to re-examine the body. Dr Magnus was more thorough in his work, correctly identifying all the teeth and locating previously unobserved restorations. On comparison the new

charting matched the ante-mortem dental information of Linda Agostini. Antonio Agostini subsequently admitted to having murdered his wife in 1934.[38-40]

This case highlights that forensic odontology was not a widely practiced or well understood discipline in Australia in the 1930's, even though it was recognised that dental characteristics had great potential to aid identification.

The first regularly cited use of DVI practices in Australia followed the crash of a Vickers Viscount aircraft, leased to Ansett Airlines by Trans Australian Airlines (TAA), into Botany Bay on 30 November 1961 resulting in the death of 15 people. The chief investigating officer, Detective Sergeant WB Ross, realised the challenge that would be faced in identifying the victims and indicated in his final report that he had researched extensively prior to planning recovery and identification procedures.

Ninety four body parts were recovered over 12 days. All identifications were confirmed by visual recognition by family and friends. Several references to the use of teeth and dentistry are made in the case file. Several of the identification summaries of the victims made reference to "*favourable comparison of dental charts*". There is no explanation as to why this comparison was favourable, except in one instance where reference is made that "..*dentist identified the teeth mentioned in the morgue book as that of the deceased*". There is no indication of what the entries in the morgue book contained, or who made them. It would also seem that the dentist making this comparison was the dentist of the victim and had no experience in forensic odontology.

One outcome from this investigation was the development of a Disaster Victim Identification Form for use by the NSW Police. Detective Sergeant Ross indicated that he modelled these forms on those of Pedoussaut.[26] Both these forms bear a striking resemblance to the current Interpol DVI forms, and it is reasonable to surmise that they provided the basis from which the Interpol forms evolved as both French and Australian police officers attended early Interpol standing committee meetings.[32]

THE DEVELOPMENT OF FORMAL FORENSIC ODONTOLOGY SERVICES IN AUSTRALIA

The development of formal services in forensic odontology in Australia has followed a similar path in most states and territories, with the spasmodic use of dentists to assist police in identification procedures occurring from around the early 1960's. This was generally an informal arrangement with little or no remuneration which meant that the dentists providing the services frequently had to complete examinations and prepare reports after hours and at weekends. It also meant that each practitioner developed their own forensic techniques and practices in isolation. Limited training in forensic odontology was available to these dental practitioners and it is a credit to their dedication and professionalism that the discipline has developed to the high standard and international reputation it enjoys today.

Dr Norbert Wright, then the Chief Dental Officer of New South Wales, in conjunction with Drs Max Bullus and John Wild, provided the odontology services for New South Wales from the early 1960's. After retiring from military service in 1981 Associate Professor Chris Griffiths returned to Sydney and began assisting Dr Wright. Even at that stage the service was still relatively unstructured and minimally remunerated, so Associate Professor Griffiths commenced the process of getting forensic odontology formally recognised and funded in New South Wales through the Health Service.

Despite the experiences of the Botany Bay crash the police in New South Wales used odontology regularly for single identifications but not routinely in multiple fatality incidents. The 83 victims of the 1977 Granville train accident were identified visually and using jewellery and documents, and the formal review of this case saw the NSW Police form a dedicated DVI squad. It was the Grafton bus crash in 1989 that highlighted the limitations of visual identification and changed practices in New South Wales. One of the 21 victims of the Grafton accident had been initially incorrectly identified visually so when, just over 2 months later, 35 people were killed when 2 buses collided near Kempsey forensic odontology was used to identify the majority of the victims.

Subsequently, forensic odontology has been used as part of the identification repertoire in all mass fatality incidents in New South Wales including the Newcastle earthquake in 1989 (13 deceased), the Thredbo landslide in 1997 (18 deceased), the Glenbrook train accident in 1999 (7 deceased) and the 2003 Waterfall train disaster (7 deceased).[32,41]

Dr Gerald (Gerry) Dalitz provided the early forensic odontology services in Victoria. In 1961 he was awarded a Doctor of Dental Science for a thesis entitled 'Some aspects of dental science - Identification of human remains' by the University of Melbourne. While collecting data for his research his expertise came to the attention of the Victoria Police and they gradually began utilising his services.[42] Dr Ross Bastiaan started working with Dr Dalitz in 1979, continuing until 1989.

The Victorian DVI odontology team was formed in 1981, and over 35 dentists volunteered to help Dr Bastiaan when the need arose. Twenty two of these volunteers assisted after the Ash Wednesday bushfires of 1983 claimed 47 lives in Victoria. Fourteen of the 22 (64%) Victorian victims who could not be visually recognised were identified via forensic odontology.[43]

Professor John Clement arrived from the UK in 1989 to take up a position in the dental school at the University of Melbourne. Upon arriving in Melbourne Professor Clement was instrumental in establishing a broader and more professional forensic odontology service in Victoria, including the introduction of the first graduate training program and the only Chair in Forensic Odontology in Australia. Forensic odontology now forms a routine part of single and multiple death investigations in Victoria, including the Kew Cottages Hostel fire in 1996 (9 deceased), the Linton bushfires in 1998 (5 deceased), a light plane crash at Myrrhee in 2002 (6 deceased), the Mt Hotham plane crash in 2005 (3 deceased), a car accident at Donald in 2006 (8 deceased), the Kerang train crash in 2007 (9 victims), the crash in the Burnely Tunnel in 2007 (3 deceased), and the bushfires of February 2009 (171 deceased).[44,45]

Dr Kenneth Brown's interest in forensic odontology was sparked in 1961 when he attended a lecture in Adelaide entitled 'Dental aspects of forensic medicine' presented by Professor Gosta Gustafson who was the Professor of Oral Pathology at the University of Lund in Sweden. In 1967 he responded to a request by the South Australian Police Department who were looking for volunteer dentists to provide them with dental expertise. Dr Brown had read widely but as there were no formal training programs in Australia at the time he used a Churchill Fellowship in 1976 to travel internationally to increase his knowledge and experience in the field of forensic odontology. His honorary work for the South Australian Police continued until a formal post in forensic odontology, the first such position in Australia, was created at the University of Adelaide in 1980.[46]

The largest mass fatality incident in the recent history of South Australia was the 'Ash Wednesday' bushfires of 1983. Twenty eight South Australians lost their lives in fires in the hills surrounding Adelaide and in the south east of the state near Mount Gambier. This incident saw the first activation of the newly written State Disaster Plan. Eight (29%) of the South Australian victims were identified by dental comparison.[47] Prior to this at accidents such as the 1970 crash of a passenger train and bus at Gawler (17 deceased) and the 1972 crash of a light aircraft at Golden Grove (8 deceased) scene recovery protocols were well established but not the use of the standardised forms to document body recovery, ante-mortem and post-mortem information. Identification of the victims of these incidents was achieved through personal effects and fingerprints. South Australian Police used these experiences and those of the New Zealand Police after the Mt Erebus plane crash to develop DVI protocols and procedures to be used in South Australia, including the routine use of dental identification. In subsequent cases including the Truro murders (7 victims), the 'Family' murders (5 victims), the Whyalla airlines crash (8 deceased) and the Snowtown murders (11 victims) forensic odontology figures largely in the identification of the victims.[48-50]

Pocock,[51] in his 1979 paper on the provision of a forensic pathology service in Western Australia, commented that a part-time forensic odontologist was "*available*

for consultation in and problem of identification". This position had been established in early 1960s and was held by Dr Frank Digwood, and became a formal part-time position in the 1980s. Dr Stephen Knott provided assistance to Dr Digwood from 1991, and succeeded him on his death in 1993.

Significant cases in Western Australia where forensic odontology has made a valuable contribution include the Sideris murder in 1981; the Merredin bus crash in 1982 and the 1988 crash of a light aircraft near Leonora which killed 10 people. It is thought that DVI practices were probably first used seriously in WA at the Gracetown cliff collapse which killed 18 teenagers in 1998.[52,53]

Dr Kon Romaniuk moved from New Zealand to take up a position in the dental school at the University of Queensland as an oral pathologist in the early 1970's. Typical with most developing services in Australia he provided an honorary consultation service in forensic odontology, later establishing a more formalised arrangement that provided a modicum of remuneration. Dr Alex Forrest started working as an assistant to Dr Romaniuk in 1985, and became the consultant forensic odontologist in 1994 after a traffic accident necessitated Kon's retirement.[54]

The Queensland Police Service has been very forward thinking with regard to DVI. In 1981 approximately 40 officers were seconded to a new "DVI Squad" and instructed to be prepared to "*recover dead bodies from disasters and identify them"*. This was prior to the establishment of the Interpol DVI Standing Committee and little in the way of formal guidelines and documentation existed so the new team had to learn and refine as they went. The first incident for the new squad occurred after a boarding house fire in the inner city suburb of Highgate Hill claimed 7 lives. Although the identification of the victims was completed via visual recognition and circumstantial evidence, the incident highlighted to the DVI officers that training and use of scientific identification techniques were very important to the future success of the squad. Over subsequent years the team attended many incidents including a bus crash in October 1994 where 11 people lost their lives, the Moura coal mine explosion in 1986 (13 deceased) and the crash of 2 Blackhawk helicopters near Townsville in June 1996 (15 deceased). The identification of the victims in these incidents was completed using a variety of methods including visual recognition and forensic odontology. Subsequent to the Blackhawk accident all major mass fatality incidents in Queensland have employed forensic odontology identification techniques as first preference. These events included the Childers Backpackers Hostel fire in June 2000 (15 victims) and the Lockhart River plane crash in May 2005 (15 victims).[54,55]

In the Northern Territory, Tyas[56] reported the use of dental evidence to identify a skeleton discovered near Alice Springs in 1971. It is believed that early forensic odontology services were provided by Dr T Paul Boyd who worked part time as an oral surgeon in the public health system. Dr John Plummer had an interest in forensic odontology from his undergraduate years but his first exposure came in the late 1970s when he was the government dentist in Katherine and was asked to help identify a family who had been drowned after a flash flood had washed away their homestead. Dr Plummer continued his professional development in forensic odontology by using a Churchill Fellowship, awarded in 1985, to travel extensively and meet and work with a number of forensic odontologists internationally. As a health service employee Dr Plummer continued his involvement in forensic dentistry on an honorary basis until his retirement in 2002. Dr Mark Leedham, a Darwin based orthodontist, currently provides the forensic odontology service for the Northern Territory.

Although the Northern territory has not experienced many mass fatality incidents, one of Australia's largest occurred in Darwin. Cyclone Tracy, which struck on Christmas Eve in 1974, resulted in the death of 71 people. While it is believed that those who were recovered at the time of the cyclone were identified visually, a number of victims who were recovered later were identified via forensic odontology. All 13 victims of the collision of two hot air balloons over Alice Springs in 1989 were also identified via dental comparison.[57]

Dr Canning, a non-practicing dentist who worked in the anatomy department at the

University of Tasmania, provided the early forensic odontology service in Tasmania. Dr Canning assisted in an ad hoc arrangement with the Tasmanian Police and would have assisted in identifying some of the victims of the 1967 bushfires (62 victims), the Mt St Canice Boiler explosion in September 1974 (8 victims) and the Tasman Bridge collapse in January of 1975 (12 victims).[58,59]

Dr Paul Taylor has been the consultant forensic odontologist in Hobart since 1990. The DVI case of note in recent memory for Tasmania is the Port Arthur massacre of 1996, where Martin Bryant shot and killed 35 and wounded 19. Three of these victims were subsequently burnt beyond visual recognition in a fire set by the gunman in a nearby guest house where he had held them hostage overnight. The identification of these three victims was assisted by odontology evidence. The identification of the other 32 victims was completed by visual recognition by family and friends, and use of engraved jewellery and documents found on the deceased.[59,60]

Covering a small geographic area, the Australian Capital Territory has not experienced many multiple fatality incidents. Incidents such as the 1991 plane crash in the Brindabellas (4 killed) and the 1993 MIG Jet Fighter crash at Canberra airport were co-ordinated and managed by the Search and Rescue division of the Australian Federal Police ACT with identifications being completed via dental comparison. These identifications were performed by Dr David Griffiths who has been the ACT consultant forensic odontologist since 1991. His desire to be involved in forensic odontology was heightened after a murder in Canberra in 1988 where the victim remained unidentified for approximately 3 months. Dr Griffiths thought this was both unacceptable and unnecessary and after completing some training courses offered his services to the ACT police.

The Australian Federal Police increased their experience and involvement in DVI with their participation in the investigation and identification of the victims of the 2002 Bali bombings (Australian Federal Police 2003). This, and involvement in the identification of victims of the 2004 Boxing Day Tsunami in Thailand, have led the AFP to refine their practices and equip themselves with a considerable amount of readily deployable equipment.[61,62]

SUMMARY

The value of dental characteristics to identify deceased individuals has been well recognised since the late nineteenth century. Interestingly, the use of dental science to aid the identification of the deceased appears to have been originally driven by external agencies, for instance police, coroner's and courts rather than from within the dental profession. Once the value of forensic odontology was recognised by dentists, the obligation to demonstrate efficacy through scientific rigour was embraced and has seen the evolution and maturity of what is now regarded as a specialty within the dental profession.

The earliest accounts of the use of forensic odontology in Australia date to the 1920's and 30's and were characterised by inexperienced practitioners and little procedural formality. An organised and semi-formal service commenced in most states sometime in the 1960's although its use by police forces was spasmodic. Today the service provided by qualified and experienced forensic odontologists is highly professional and regularly utilised by police and coronial services. The majority of Australian forensic odontology specialists have considerable experience in the identification of victims of mass fatality incidents, both within Australia and internationally.

Disaster Victim Identification principles have been employed by some international police services from the 1940s, but it was the establishment of the Interpol Standing Committee on Disaster Victim Identification in 1982 which brought the importance of a coordinated and well documented response to both the recovery and identification of the victims of a mass fatality incident to the attention of most western police forces and associated forensic specialities. In Australia, the 1961 crash of a Vickers Viscount aircraft into Botany Bay was the first use of structured DVI practices. The development of state and territory specific DVI activities, including the use of forensic odontology as a core identification tool, was frequently linked to a specific incident. The activities of the Australian Disaster Victim

Identification Committee, established in 1996, have seen consistencies in practice and procedures promulgated across the various Australian police jurisdictions. Australian DVI practices are now regarded as representing international best practice.

ACKNOWLEDGEMENTS

My thanks to all the Forensic Odontologists and State DVI Commanders who willingly gave of their time, experience and memories. The interviews to collect the information presented in this article were conducted as part of a PhD project by the author under the University of Newcastle Ethics number H-091-0805.

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