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Evolution of Forensic Odontology services in Queensland, 1994 – August 2012

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Introduction

Forensic Odontology services in Queensland have undergone rapid evolution in the last two decades with major changes occurring since CT facilities became available at Queensland Health Forensic and Scientific Services (QHFSS) in 2000. This has been driven partly by the changing management environment in forensic mortality services where increased accountability and transparency require more robust, less subjective, evidence-based opinions in cases where a wide demographic variability, including availability of new technologies and procedures. More general influences include growing awareness of the need to reduce unnecessary invasive procedures during post-mortem examination, more conservative approaches to writing legal statements, universal and consistent peer review processes, and improved evidence reporting in written reports. Collectively, these changes have resulted in a consistent improvement in standards.

We report here on the expansion of the types of services we provide to include examinations of medical-legal assessments and pathology consultations, as well as regular requests to assist in investigations of reported deaths. This demonstrates that Forensic Odontology is becoming an increasingly important component of the Forensic Pathology team.

Statistical trends during the period 1994 – August 2012 demonstrate a steady increase in demand for Forensic Odontology consultations. Analysis of these trends and case types, procedures and outcomes may influence possible directions for future development and funding.

Figure 1. Total Cases per Year (1994 – Aug 2012)

Figure 2. Queensland Residents (1993 – 2011)

Figure 3. Case Mix (1994 – Aug 2012)

Figure 4. Outcomes of Forensic Odontology Examinations for ID (1994 – Aug 2012)

Figure 5. Jaw Removal (1994 – Aug 2012)

Figure 6. Causes of Death (1994 – Aug 2012)

Figure 7. Radiography Profile (1995 – Aug 2012)

Table: General categories of causes of death among cases for Forensic Odontology show basically similar proportions from year to year. This pattern is influenced in years where large numbers of mass disaster victims were identified. A rising trend shown in Figure 6 (see light blue bar segments) is the increasing number of military fatalities returning from active service in the Middle East during recent years, for forensic identification and post-mortem dental records conducted in their home-state of Queensland. The large number of military fatalities shown in 1996 was due to the crash of two Army Blackhawk helicopters during a night-time training exercise with special forces in Townsville.

The introduction of the Aquilion 16-Slice CT Scanner at QHFSS in 2009 has revolutionised the use of imaging for disaster victim identification (DVI) and this is now used routinely to provide 3-D image data, particularly useful in comparing overall Post Mortem dental records (see red bar segments in Figure 3).

In 1994, it was considered routine to remove both the mandible and maxilla for examination. We now undertake radiographic examination and comparison whenever feasible, to increase the reliability of the outcome. This means the need to remove the jaws in 2012, extraordinary circumstances would be required for maxillary removal, and where we need to remove mandibles for stability purposes. In all cases of DVI, priority is obtained from the QLD State Coroner.

If mandibular removal is required, it is now performed in such a way that the replaced bony and soft tissues look undisturbed at the end of the examination. Even in DVI situations, the team will now leave the mad for examination, prior permission is sought from the QLD State Coroner.

The radiography profile shows the steady increase in the use of CT facilities became available at Queensland Health Forensic and Scientific Services (QHFSS) in 2000. Tomography (CBVT) technology into dental practice, it is particularly useful in comparing overall Post Mortem dental records (see red bar segments in Figure 7).

With the increasing use of Cone Beam Volumetric Tomography (CBVT) technology into dental practice, it is likely that in the future we will use better 3-D CT facilities to provide overall Post Mortem dental records (see red bar segments in Figure 7).

Peers Review & Credentialing

In 1994, it was considered normal for a Forensic Odontologist in Queensland to work alone during routine identification work (not for Disaster Victim Identification), and indeed only a single Forensic Odontologist was employed by QHFSS between 1994 – 2007, mainly after hours. As the new millennium approached, it was obvious that other forensic specialties (and indeed Forensic Odontologists in other jurisdictions) were working in pairs at all times and that peer review was an essential part of the process. Since 2000 a peer review system was established at QHFSS. Formal peer review of a DVI case must be mandatory, and this system explicitly requires this, including evidential statements and statutory declarations. External independent peer review is a new protocol currently being negotiated between the Forensic Odontology staff in Queensland and New South Wales.

Since 2011, all Forensic Odontology staff working in Queensland Health facilities such as QHFSS must now be appropriately credentiated by the Health Services Support Agency (HSSA).

Credentiation & Scope of Clinical Practice Committee, for the provision of any specialist Forensic Odontology services. This mandatory credentiation requirement is reviewed for each member of the team on an annual basis.

Conclusion

Expectations, standards, and protocols in Forensic Odontology have changed during the last 18 years in Queensland. Case numbers have steadily risen, which has slightly lagged behind the rate of population influx into Queensland (Figure 1). The Forensic Odontology case mix is now more evenly distributed across all case types, with other QHFSS staff for our dental pathologists (Figure 3). This corresponds to the increasing number of cases (e.g. Pathology Consultations, where identification of the deceased is not an issue (Figure 4)). In line with professional and community expectations, we have used radiographs and image comparison more extensively to reduce our dependence on physical examinations and charting a comparison of deceased dentitions. This has been facilitated by the development of new software tools for post-mortem dental records. The increasing use of the Forensic Odontology Casework Manual (Figure 3) has reduced the need for paper-based reports by over 70% in recent years. The introduction of the QHFSS in 2000 has revolutionised our use of radiographs during Forensic Odontologist casework (Figure 7). This will not doubt continue into the future with increased use of Cone-Beam Volumetric Tomography (CBVT) for treatment planning by dental practitioners.

Where it was once considered permissible for a Forensic Odontologist to perform routine casework alone, now peer-review forms an important part of quality assurance, and is properly viewed as an essential part of any corporate quality control system. At QHFSS we have formalised this process via external peer- review and credentiation, and will soon introduce independent external peer review with our Forensic Odontology colleagues in New South Wales.