RPII inspections in the dental sector

DR STEPHEN FENNELL explains what is involved in an inspection of a dental practice by the Radiological Protection Institute of Ireland.

Introduction

The Irish licensing system was first established in 1977 with the passage of the Nuclear Energy (General Control of Fissile Materials, Radioactive Substances and Irradiating Apparatus) Order 1977. This legislation has long since been revoked and current regulations are provided by S.I. No. 125 of 2000. The Radiological Protection Institute of Ireland’s (RPII) predecessor, the Nuclear Energy Board (NEB), commenced issuing licences in 1977 and by 1985 there were 300 active licences in the medical and industrial sectors. In 1989, the dental sector was brought within the licensing system, resulting in a significant increase in the number of licences issued by the RPII. Since then, there has been a steady increase in the number of new licences issued, and currently there are 1,743 licences issued to licensees in the dental, medical, educational, veterinary and distribution sectors. The dental sector represents a significant proportion of the licensee base and Figure 1 shows the number of dental licences for the period 1992-2011. There are currently 947 dental licensees, and for the most part they comprise private dental surgeries with a single intra-oral dental x-ray unit. Other dental practices currently licensed include the HSE public dental clinics, the two dental teaching hospitals and the dental facilities in prisons and defence force bases, the responsibilities for which fall under the Departments of Justice and Defence, respectively.

In recent years more complex procedures using equipment such as cone-beam CT units are being carried out in dental practices. At present, there are 12 licensees using these units. The RPII is responsible for ensuring that workers and members of the public are adequately protected against the harmful effects of ionising radiation in accordance with the requirements of S.I. No. 125 of 2000, which enacts the 1996 European Basic Safety Standards Directive. However, its remit does not extend to ensuring the protection of the patient. This responsibility falls to the Minister for Health under S.I. No. 478 of 2002, which enacts the 1997 European Medical Exposures Directive in Irish legislation. Therefore, when carrying out an inspection, the RPII does not consider patient-related issues, such as diagnostic reference levels or clinical procedures. However, patients of the practice are considered by the RPII to be members of the public while they are sitting in the waiting room.

The total number of inspections undertaken in a given year broadly reflects the staff resources available and the priorities identified at any given time. Inspections of dental practices have always represented a small proportion of the total number of inspections carried out each year by the RPII. Figure 2 illustrates the number of dental inspections...
undertaken in the years 1996 to 2011. The number of inspections carried out in other sectors is also included for comparison.

Purpose of inspections
Each year the RPII undertakes a programme of inspections, which is approved by its Board. In developing the inspection programme, account is taken of the following factors:

i. radiological risk associated with each category of licensee;
ii. date of most recent inspection for each licensee;
iii. number of licensees within each category;
iv. reported incidents during the year;
v. issues related to individual licensees;
vii. recommendations from all inspectors or other relevant personnel; and,
vii. a policy direction from the Board of the RPII.

As the radiological risk associated with dental radiology is far lower than that associated with, for example, a nuclear medicine or radiotherapy department, a much greater priority is placed on inspections of large hospitals instead of low-risk activities such as dental radiology or DXA screening. However, in line with a proportionate approach to surveillance in the sector, a small number of inspections of dental practices are carried out each year.

In an initiative to assess the overall radiation protection standards since the introduction of the radiation protection adviser (RPA) requirements in 2008, the inspection programmes for 2010 and 2011 included a focus on dental licensees. Over the course of these two years, 107 inspections were completed in dental practices in both the private and public sectors. Over the course of these two years, 107 inspections were completed in dental practices in both the private and public sectors. One hundred and three of these were planned and the dentist given advance notice of the date of the inspection, three were unannounced, and one was undertaken as a result of a concern from a member of the public who had contacted the RPII. The findings of these inspections are currently being analysed and will be taken into account in the development of a new graded approach to authorisation, which will look at introducing alternative models to licensing in the future.

While inspections are undertaken to assess compliance with legislation and licence conditions, an inspector’s main concern is to ensure that the dentist and staff, as well as any members of the public, including patients in the waiting areas, are protected against the harmful effects of ionising radiation. In many cases an inspector will highlight examples of good practice previously observed in similar practices, or identify issues that should be discussed by the dentist with their appointed RPA. Accordingly, the inspection provides an opportunity to further improve radiation protection standards to the benefit of the dentist, staff and the public.

Accreditation
The RPII has developed a quality system for its inspection activities and is accredited to ISO 17020, which is an international standard specifically designed for inspection bodies. The quality system provides a framework for planning and reviewing the annual inspection programme, how inspections shall be conducted, the follow-up of inspections and the training of inspectors. Each year the Irish National Accreditation Board (INAB) carries out a surveillance visit on the RPII to assess whether it continues to comply with the requirements of the standard. A major component of the INAB annual visit involves the observation of RPII inspectors carrying out inspections across various sectors, including the dental sector. In addition to this external audit, the technical manager of the RPII’s Regulatory Service witnesses each inspector on an annual basis while he/she carries out an inspection. This inspection witnessing ensures that appropriate standards for inspections are maintained and helps to ensure consistency between inspections and individual inspectors.

Inspection format
Inspections of dental practices are usually arranged in advance by telephone, and an email is sent to confirm the date and time. While the RPII can also carry out inspections unannounced, in practice almost all inspections are carried out by prior appointment. The email also advises as to what records the inspector will want to review on the day of the inspection, such as RPA risk assessments, quality assurance (QA) reports, shielding assessments, equipment service records and personal dosimetry records where relevant. The inspector
will want to meet with the radiation protection officer who is responsible for the day-to-day radiation protection matters. While the dentist is welcome to invite their RPA to attend the inspection, their participation is not required by the RPII. An inspection of a dental practice will usually take about an hour and a half. The inspector will, where possible, try to fit in with the dentist’s schedule and minimise the time during which the x-ray unit/surgery is unavailable to the practice. All inspectors carry photographic identification and an inspector’s warrant, which is available for examination.

The inspection commences with an entrance meeting, at which the inspector explains to the dentist the purpose and format of the inspection. The inspector will then go through the administrative aspects of the licence, recording all information received on an inspection audit form. Issues usually considered during this meeting include QA testing, RPA reports, requirements for personal dosimetry and servicing arrangements.

Once the entrance meeting has been completed, the inspection moves to the locations where the x-ray units are used. The inspector will usually invite the dentist to explain the procedure he/she follows when taking x-rays. This is to ensure that proper radiation protection procedures are being implemented. The inspection will also examine the x-ray unit to assess its physical condition and will undertake some spot check measurements of its radiation output. Measurements are normally made on intra-oral units and parameters checked, including the kilo-voltage, radiation output and exposure duration for a typical setting used for an x-ray of an adult mandibular molar tooth. These tests are undertaken to assess the performance of the x-ray unit rather than the dose delivered to the patient, which is outside the remit of the RPII. Where the measured values fall outside expected values, the dentist is usually advised to consult with their appointed RPA or service engineer. The inspector also reviews the layout of the facility to determine whether there are any concerns for possible exposure to the dentist, staff or patients in the waiting room. In particular, the location of the x-ray unit within the surgery, the presence of doors and windows, as well as the use of adjoining locations, are all considered by the inspector.

Experience to date has shown that where the dentist has consulted with an RPA in the design and layout of the surgery, few problems have arisen. In the event that an inspector observes a situation that compromises radiation safety and which, in the opinion of the inspector, poses a serious hazard to workers or members of the public, the dentist is advised of this issue immediately and directed to cease using the x-ray unit until such time as the situation has been rectified. To conclude the inspection, an exit meeting is convened between the inspector and the dentist, during which a summary of the inspection findings is presented verbally. The RPII will issue an inspection report to the dentist within 28 days of the inspection date. The report sets out the non-compliances observed, as measured against the licence conditions and relevant legislation, as well as other items requiring attention. Each of these items must be addressed by the dentist, who must forward a written response to the RPII within 28 days of receiving the report. In some cases it will not be possible to address all of the inspection findings within 28 days – in these cases the dentist should advise the RPII of their plans for the completion of these issues, including time lines where relevant. In addition, the inspection report may also include some recommendations that the practice could consider towards the further improvement of radiation protection practices.

**Conclusion**

Since the RPII commenced inspections of dental practices in the 1980s, there have been significant improvements in radiation protection across the sector. X-ray units that did not provide for appropriate protection, such as those with mechanical timers or pointed cones, have long since been decommissioned, and modern units are generally safer and more reliable. While almost all inspections result in some findings or observations, it is reassuring to note that many of these relate to administrative requirements of the licence rather than poor radiation protection. Overall, the standards of radiation protection across the Irish dental sector are very good.

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Endodontic-periodontal management of a maxillary lateral incisor with an associated radicular lingual groove and severe periapical osseous destruction – a case report

Précis
Radicular lingual grooves are morphological defects that can create periodontal and pulpal pathology, but they may be difficult to identify as an aetiological factor. This article discusses their presentation and management.

Abstract
Radicular lingual grooves are morphological defects, which are found most frequently in maxillary anterior teeth and are a predisposing factor for periodontal disease. They are easily overlooked as aetiologic factors, as these grooves are covered by periodontal tissues. This case report presents a successful management of a case of a maxillary lateral incisor with an associated radicular lingual groove and severe periapical osseous destruction in a 30-year-old female patient. A combination of endodontic treatment, radiculoplasty to eliminate the radicular lingual groove, and periapical surgery to eliminate the periapical osseous defect was used. At two-year follow-up, the patient was comfortable and complete resolution of the periapical pathology was evident.

Key words: maxillary lateral incisor, periapical surgery, radicular lingual groove.