REPORTING OF DENTAL RADIOGRAPHS IN GENERAL DENTAL PRACTICE

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Introduction
The selection, processing and interpretation of dental radiographs is the subject of a number of well established, detailed quality assurance programmes such as those outlined in the National Radiation Protection Board [NRPB]'s Guidance Notes for Dental Practitioners. Nevertheless, the detail of radiographic reporting receives much less attention. On one hand, it is apparent that many radiographs are simply filed away with no report. This is unacceptable practice. On the other hand, teachers and examiners for the FGDP(UK)'s diplomas, such as the Diploma in Restorative Dentistry, will often see case studies from candidates containing the most detailed radiographic reports, evaluating every surface, every restoration and presenting an abundance of negative findings. This is unrealistic and cannot represent the candidates' everyday practice. Nonetheless, this does raise the following questions:

- What should be recorded in a radiographic report?
- How much detail should be written?
- What is the process of making a radiographic report?

This article will address these questions and, in addition, will outline legislation and guidelines in relation to radiographic reporting.

Legislation and guidelines
While a number of regulations govern the use of ionising radiation in dental practices, the relevant legislation in this instance is the Ionising Radiation (Medical Exposure) Regulations 2000 [IRMER 2000]. These regulations state that "The written procedures... shall include procedures for the carrying out and recording of an evaluation for each medical exposure", and that "evaluation should detail the resulting diagnostic findings or therapeutic implications".²

Current legislation as it applies to dentistry is usefully summarised in the NRPB's Guidance Notes for Dental Practitioners. These state that those who carry out the practical aspects of a radiographic examination are defined as 'operators'. 'Operator' roles include the clinical evaluation of radiographs. 'Clinical evaluation' is further clarified as follows:

"Clinical evaluation' does not necessarily have to be a full radiology report, but should show that each radiograph has been evaluated and should provide enough information so that it can be subject to a later audit. For example, this information may include:

- the charting of caries;
- findings relevant to the patient's management or prognosis;
- in the case of a pre-extraction radiograph, it may be sufficient to record either 'root form simple' or 'nothing abnormal diagnosed'.¹

These guidance notes, therefore, make a distinction between 'clinical evaluation' and a 'full radiology report'. While the difference is unclear, this wording could be interpreted as meaning that it is unnecessary to record negative findings. A key phrase would seem to be "findings relevant to the patient's management or prognosis". This is a very broad requirement which appears to encompass everything that might be required from a radiology report.

A legal requirement is not necessarily the same as 'good practice'. Therefore, two existing guidance documents were consulted in order to establish current good practice on radiographic reporting. First, the FGDP(UK) standards publication Clinical Examination and Record-Keeping: Good Practice Guidelines, was found to state only that "regulations stipulate that all radiographs must be justified and reported in the notes", and, under 'Clinical evaluation (reporting)', that "all radiographs must be reported".³ Secondly, the FGDP(UK) standards publication Standards in Dentistry asserts that "a written note [should be] kept of important features on radiographs".⁴

The distinction between an 'evaluation' and 'a full radiographic report' made in the Guidance Notes for Dental Practitioners' remains unclear. The FGDP(UK)'s Clinical Examination and Record Keeping: Good Practice Guidelines³ does not make such a distinction. Nevertheless, while some confusion remains and there is little guidance on the detail of reporting, the following conclusions may be drawn from the existing legislation and guidelines:

- All radiographs must be reported and a record kept
- Findings relevant to the patient's management or prognosis should be recorded
- It is acceptable practice to record only positive findings

Why report?
Setting aside legal requirements, there are very good reasons to report on all radiographs. A new patient at the practice may have multiple dental problems requiring a complex, multidisciplinary approach. After the prescription of radiographs, according to the FGDP(UK)'s
Selection Criteria in Dental Radiography, a structured approach to reporting is an excellent beginning to clarify your thoughts on the approach to treatment planning. Also, from the medicolegal point of view, a clear, contemporaneous radiographic report may provide justification for treatment decisions made at the time of treatment planning. For example, it may be appropriate to extract a tooth which is borderline restorable. A clear radiographic report, together with other aspects of the patient’s history and examination, will provide good evidence of the thought process leading to the treatment decision.

Conversely, it is acceptable not to provide operative treatment for some early carious lesions in some patients. For example, early enamel lesions, in a patient who has been recently introduced to a preventive regime, may sometimes be simply observed and monitored. A radiographic report at the time the decision is made will help demonstrate the wisdom of this strategy. The FGDP(UK)’s Selection Criteria in Dental Radiography recommends intervals for periodic bitewing radiography. These are based on a caries risk assessment for each patient. Radiographs therefore provide solid evidence to support the assessment at the time that the decision was made. A contemporaneous report will, therefore, clarify and support the decision making process. Over a period of time, the justification for continued monitoring or operative intervention can be recorded and supported in the light of previous reports.

Carrying out a report

The first requirement for carrying out a radiographic report is high quality radiographs observed under optimum viewing conditions. This applies equally to conventional and digital radiography. It therefore follows that a quality assurance programme, such as the one outlined in the NRPB’s Guidance Notes for Dental Practitioners should be undertaken. Holding a conventional radiograph up to the light is not acceptable and will seriously reduce the amount of information obtained from a radiograph. Optimum viewing conditions for conventional film include good illumination, masking of peripheral light and magnification. A hooded x-ray viewer, such as that shown in Figure 1, provides near ideal viewing conditions. In the case of digital radiographs, monitor quality, monitor location, viewing distance and ambient lighting conditions are all important factors. Digital radiographs printed on paper are rarely, if ever, acceptable for diagnostic purposes.

Figure 1: Hooded x-ray viewer

It is important to view and report radiographs in a systematic fashion. As an aid to this process it is helpful to scan across each radiograph considering each aspect in turn, perhaps in a circular motion of eye movement.

One format for writing an x-ray report is to consider the following aspects in turn. Taking into account these five aspects of the radiograph, it follows that the circular scan will take place at least five times.

Periodontal
- eg. alveolar bone levels
- presence of calculus and other plaque retaining factors

Caries
- eg. site
- depth

Restorations
- eg. presence of overhangs or deficiencies
- particularly heavily restored teeth

Endodontic and periapical
- eg. periapical radiolucencies
- quality of root canal treatments or posts

Other
- eg. presence of a retained root
- an unerupted tooth
- an amalgam tattoo
For an extraoral radiograph, such as a panoramic radiograph, in addition to the aspects listed above the report may include the following aspects:

Whole radiograph
eg. developmental age of the patient

Body and ramus of the mandible
eg. radiolucencies or radiopacities

Other structures
eg. radiopacities in the maxillary sinuses or nasal cavity

Specific requirements, such as available bone for dental implant placement or position of relevant anatomical structures, will often be the justification for radiographs. Nevertheless, radiographs should not be examined for this to the exclusion of other findings.

Comparison with previous radiographs will often be relevant. For example, a follow-up radiograph of an endodontically treated tooth may require a comparison with a previous radiograph to assess whether a periapical radiolucency is increasing or decreasing in size. Similarly, a comparison with previous periodic bitewing radiographs may reveal whether an observed early carious lesion is stable or increasing in size. The same is true for periodontal bone levels. Such comparison should form part of the radiographic report.

It is worth restating that radiographs, in themselves, form only part of the information required to form a diagnosis. Other clinical information will always be relevant.

The issue of what to report radiographically raises the question of negative findings. For example, is it acceptable practice to write ‘B/Ws NAD’ (bitewings, nothing abnormal diagnosed) when reporting periodic bitewings? For a long standing patient, there may have been a series of several periodic bitewings for a patient with very little to report. In terms of the legislation, the answer is probably ‘yes’. The NRPB’s Guidance Notes for Dental Practitioners give an example of writing ‘nothing abnormal diagnosed’ (NAD) in paragraph 2.46.1 Nevertheless, it may be considered better practice to list each aspect of the radiograph that has been checked and write ‘NAD’ against each one. Further, it would be helpful to state when a comparison has been made with previous radiographs. In the same paragraph of Guidance Notes for Dental Practitioners, the key phrase is “findings relevant to the patient’s management or prognosis”. This would suggest that, for example, a list of all radiographically satisfactory restorations is not necessary. A long list of negative findings can only obscure the important information in a report. In any event, it is likely that this is found only in submissions of case studies for examinations and is not realistic for everyday practice.

Having said that, it may be that a satisfactory, but unexpectedly deep, restoration is seen on a radiograph of a new patient. In this case it would be worth noting on a radiographic report so that a vitality test can be carried out on the tooth. In all cases, “findings relevant to the patient’s management or prognosis” must remain a matter of clinical judgement.

Who should report on dental radiographs?
IR(ME)R 2000 defines a number of roles in the context of radiation protection for patients, including the ‘referrer’ (who requests X-ray examinations), the practitioner (who performs the justification of the X-ray examination) and ‘operators’.

An operator is defined as a person who carries out one or more practical aspects of a radiographic examination. This could be anything from pressing the exposure button or processing radiographic films, through to reporting. In the context of radiographic reporting, this person must be adequately trained to carry out such evaluation. In most dental practices, under most circumstances, it is simply the dentist who prescribes, justifies and takes the radiograph before making a report. Undergraduate dental training is considered sufficient for this.

Nonetheless, when a dentist refers for a radiographic examination, the situation becomes more complicated. This is particularly true for cone-beam computed tomography examinations (CBCT). The number of these referrals is increasing because these views can be very helpful in planning the placement of dental implants. The Health Protection Agency (HPA) has produced guidelines on the safe use of CBCT equipment.2 These state that written procedures should be in place which set out the arrangements for clinical evaluation and reporting. If the referring dentist is to report on the CBCT examination, then, under IR(ME)R 2000, they should be adequately trained to do so. Undergraduate dental training is not sufficient for this and the HPA guidelines state that additional training is necessary.

A recent case reinforces the wisdom of this approach. A patient was referred to a dental hospital for a CBCT examination prior to dental implant placement. The images were reported by a consultant in oral and maxillofacial radiology. Subtle changes were observed at the edge of the images which led the consultant to order a more extensive CT examination. The result was a provisional diagnosis of a skull base tumour and the patient was referred appropriately. These changes were not recognisable by the referring practitioner.
A suggested template for reporting complex cases is available on the FGDP(UK) website, and contains an example report from the radiographs presented in Figure 2.

This article has considered legislation and guidelines as they apply to reporting of dental radiographs and suggests a pragmatic, systematic approach to reporting.

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