Module 4 – Diagnosis and Radiography

The fourth module in the BDIA Certificate covers the diagnosis of oral disease and the radiographic (X-ray) techniques that help in coming to a diagnosis.

Dental professionals look after the whole oral cavity and any disease in the mouth is referred to as oral disease. The more specific term of dental disease refers only to disease affecting the teeth and tissue supporting the teeth (the periodontal tissue). So, all dental disease is a form of oral disease, but not vice versa.

Regular examinations are required to pick up many oral diseases as these are often asymptomatic, especially in the early stages, so the patient is unaware there is a problem.

Richard McGowan is a product manager at Straumann UK.

Oral examinations

Your regular check-up at the dentist is more than a mere formality. The first step, before examination even takes place, is to get a record of a patient's medical history. This is required before anything can be undertaken, as some medical treatments can have unintended side-effects that could influence any dental work.

If a patient presents with symptoms, the dentist must get the patient to explain the issue in their own words. Things like the site of the pain, length of time the pain has been present and how severe it is will all help to point toward the underlying cause.

The examination itself starts outside the mouth, looking for any signs of asymmetry (such as swelling) or for any areas of tenderness.

When examining the inside of the mouth, a good light and a mouth mirror will help to locate any ulcers or swelling which may be present on any of the mouth's soft surfaces (such as cheeks, lips and tongue). This will also act as a check for oral cancer.

The next stage is an assessment of the gums, both visually, and with a blunt-ended dental probe, as part of a basic periodontal examination (such probes will be called BPE probes). The probe is inserted into the 'pocket' between the teeth and gums and the depth of insertion recorded on a scale of 0 to 5 (0 being healthy and 5 being a pocket over 5.5mm deep).

The same probe can then be used to check the tooth surfaces. Tapping the surface can reveal hidden caries (dental disease). Special attention will be paid to any existing restorations to see that these are still sound and that no secondary problems have arisen.

X-rays

Often, dental caries can be hidden from a visual inspection, as the decay has occurred in an inaccessible place, such as interdentally or underneath a crown or filling.

When X-rays are taken, the denser the item, the whiter it appears on the X-ray. Therefore, any greyer areas in an X-ray may indicate nerves and blood vessels, and black areas open space. Equally, these areas could show the early stages of dental caries (where the tooth structure starts to break down, or crack within the teeth. Whiter areas will be denser teeth (especially solid enamel) and bone, and solid white areas can indicate previous restorations, such as crowns and bridges, dental implants or amalgam and composite filling materials. These materials are normally radiopaque, specifically so they can be identified with radiography.

Intraoral radiography (2D)

Traditionally, intraoral radiography (inside the mouth) used radiographic➲

film inserted into the mouth on the opposite side of the tooth being examined. An X-ray generator (normally attached to an arm near the dental chair), would then be moved parallel to the X-ray film before the X-rays were emitted. The exposed X-ray film would then need developing before it could be viewed. X-ray films come in a range of sizes, from 0-4, dependant on the size of the area needing to be X-rayed (and the size of the patient – size 0 and 1 are for children).

In modern dentistry, the vast majority of X-rays taken will be digital, using either re-usable phosphor plates (that work in a similar way to traditional film but can be processed far quicker) or using a digital receptor (either wired or wireless) which will produce an instant X-ray image on a computer screen, therefore allowing for instant diagnosis, and potentially, instant treatment.

Extra-oral radiography (3D)

The main limitation of intraoral radiography is the number of teeth that can be X-rayed at once. For a more complete view of the whole mouth (and associated structures like the temporomandibular joint and the sinuses) larger machines are required.

Panoramic X-rays machines are devices that the patient stands inside and the X-ray head moves around the patient's head. This produces a long X-ray that flattens out the whole patient's mouth, showing all the teeth (erupted and un-erupted).

Cephalometric X-rays will take an X-ray of the front or side view of the skull.

3D radiography

CBCT (Cone Beam Computer Tomography) X-ray machines enable dentists to generate a three-dimensional model of the patient's mouth. CBCTs take a series of X-ray slices which can then be put together by a computer to form a 3D model.

Safety

Due to the radiation omitted from these, its siting and operation is highly regulated to limit exposure to the patient (beyond the area that is being examined) and others within in the practice (staff, relatives or other patients). Any radiation exposure increases the risk of cancer, but dental X-rays emit very low dosages. Nevertheless, all steps must be taken to only expose the patient to the minimum amount of radiation to be diagnostically useful.

Ongoing radiographic training is required as part of dentists' ongoing CPD (five hours every five years). Dental nurses also need specific qualifications in relation to X-rays, and hygienists and therapists require adequate training.

The use of X-ray devices is covered by The Ionising Radiation Regulation 1999 and The Ionising Radiation (Medical Exposure) Regulations 2000.

For more details on the BDIA certificate, go to **www.introductiontodentistry.co.uk**

BDIA Certificate: Introduction to Dentistry

The *BDIA Certificate: Introduction to Dentistry* is a training package designed by specialists to help those who are new to dentistry gain a better understanding of the work of the dental team, the specialist terms, equipment and procedures used by the dental profession, as well as a good overview of the dental industry as a whole.

This self-learning course aims to fast track students with knowledge of dentistry and is an ideal learning resource for anyone in the dental industry who did not come from a clinical background.

To find out more about the subjects covered by the course modules, or to enrol and gain instant access to the course materials, visit **www.IntroductionToDentistry.co.uk**

2017 Examinations

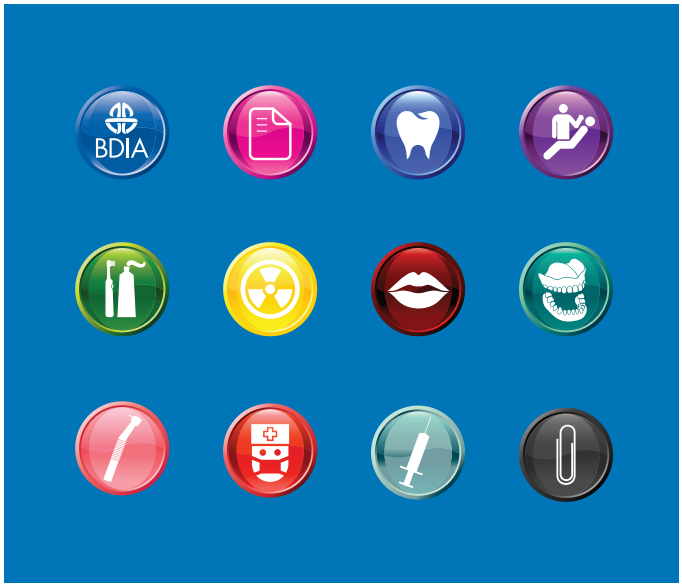
Wednesday, 17 May, 2017

Wednesday, 15 November, 2017

Time: 10am-12pm or 1pm-3pm

Venue: London

For general enquiries or to book your exam, please email **nicolamcging@bdia.org.uk**



British Dental Industry Association

BDIA Certificate: Introduction to Dentistry

A personal learning course for those new to dentistry

BDIA

MI dentistry – Is it now time to change?

The BDIA recently asked Professor **Avijit Banerjee** to comment on the profession's vision for the future of oral healthcare provision.

The management of oral healthcare and dental disease has evolved over many years by involving both the oral healthcare profession and patients. Is now the time to move from just evolution to more substantial implementation and action that could have a significant long-term impact on oral healthcare provision in the UK?

The traditional approach of removing dental caries surgically, preparing cavities and placing restorations does not cure the disease. However, both the profession and the public have come to understand and believe in this approach, partly due to the traditional model of restorative operative intervention and the historic fee-per-item remuneration systems. However, a significant number of oral healthcare practices in the UK and other countries have already changed to a more preventative focus, choosing non-operative options whenever possible.

Minimum intervention (MI) oral healthcare is a term that is becoming more widespread and popular but what does it really mean for dentists, the oral healthcare team and, perhaps as importantly, the public? As we know, contemporary MI dentistry is concerned with preventing disease rather than restoring teeth once the damage has occurred; attitudes towards remuneration and financial rewards for restorative intervention need to adapt to reflect these changes and up to date concepts of best, evidence-based practice. Minimum intervention dentistry is the oral physician's holistic team-care approach to maintaining long-term oral health for the patient, using patient-focused care plans combined with a more proactive approach to the management of patients' expectations. Patients must realise that dental caries is a life-style related, behavioural disease that is ultimately their responsibility to control, with the help of the oral healthcare professional team. In the same way that patients are now actively encouraged to stop smoking, take regular exercise and stick to a healthy diet, they must also appreciate the importance of, and take responsibility for, their own oral health. A complete team care approach is needed to support the patient to achieve this, including the nurse, hygienist, therapist, reception staff and practice manager. This team approach will give the patient a consistent➲

What does the future hold for today's dental students?

Avijit Banerjee is a professor of cariology and operative dentistry at King's College, London.

take-home message and a long-term preventative care plan.

The profession, along with other stakeholders including dental industry partners, needs to educate and inform patients about the positive influence good oral health has on systemic health. In achieving this, the oral health messages can be combined with the general health messages alluded to above.

There are two critical factors that will affect the successful outcome of MI oral care: the dentist and the patient. Do all dentists have the contemporary knowledge and skills to risk assess and intervene only when lesions are progressing actively and irreversibly? Do they have the technical skills and knowledge to implement MI dentistry successfully? What does the patient think? Will they understand what they are being told? The delivery of information by healthcare professionals is key to a patient's understanding of the medical complexities of their condition and the oral healthcare profession is no different. Patients need this technical information explained, along with any relevant material risks, in terms they understand and are comfortable with in order to make informed choices about their oral health. It all sounds quite simple, but is it?

In terms of delivering successful MI dentistry, 'technique sensitivity' is used to describe the high levels of technical difficulty in handling and placing adhesive restorations within the exacting oral environment that will permit a successful medium to long term restorative outcome. For patients, it is far simpler. It means they get a less invasive treatment with far better results for the short and longer term. It is also true that contemporary minimally invasive adhesive operative techniques do require greater control of the materials and their environment, but these are skills that should be understood, learnt and honed rather than criticised simplistically as being unduly complex and too difficult to perform under current healthcare regulatory systems. Evolution in dental biomaterials science has created modern adhesive materials that complement the MI oral care philosophy. The training of new dental graduates reflects the MI philosophy change as education in minimally invasive operative skills takes precedent over the essentially mechanistic surgical teachings of past curricula.

Indeed, MI dentistry poses the greatest challenge to that generation of dentists who were trained traditionally but are still actively practising in an ever changing and progressing world. This group of clinicians face the struggle of maintaining their current practice whilst potentially having to retrain in the contemporary academic and operative technologies as well as their implementation.

Where a student is responsible for the individual patient's care for the duration of their training, they will see and learn from the benefits or the problems of the care plans they have devised and carried out for their patients. Although some dental schools have embraced this education model to varying levels, there are still those who follow the more traditional approach of teaching mechanistic disease management operative skills primarily, with additional modular teaching of prevention – which could be argued to be an inappropriate model for modern conservative dentistry. The traditional model promotes erroneously the perceived achievement of cutting the greatest number of cavities and placing restorations as the primary outcome measure of clinical competence to cure disease; a point-collecting philosophy is embedded into a young dentist's psyche, which is then carried forward into oral healthcare practice where it is further encouraged by the regulatory and remunerative systems in place. It is the responsibility of dental schools to equip future dentists and members of the oral healthcare team with the core MI skills, competencies and understanding to be able to care for the patients of the future whose needs will be different from those in the past.

It is clear that caries does not need to be treated as if it were gangrene with complete surgical excision including a 'healthy margin' – the classic idea that has underpinned caries management for years. The chance to give carious tissue the opportunity to remineralise and, when continuing progression is observed, the use of a biologically selective approach to caries removal should become the norm.

With new techniques, materials and equipment entrenched in dental schools, new and established dentists should better understand the changes in oral healthcare perceptions from both the patients and profession's point of view. These changes should be reflected and applied to modern, possibly unified under/postgraduate dental curricula. Contemporary learning outcomes accompanied by rigorous longitudinal assessment are in need of development, rather than relying solely on the traditional educational formulae and examination of the past. There are a proportion of practitioners working today who may not have the confidence required to practice the appropriate skill set for MI dentistry and who are in need of good quality postgraduate education and CPD. This can be delivered in a variety of ways, including lectures, seminars and hands-on courses. In some cases, further coherent education in a practical setting is required so the skill sets learned on day one can be implemented the next day, assessed and refined accordingly. Please Google search "KCL AMID" for further information on the only post graduate, PG distance-learning, masters-level programme on MI dentistry open to practising dentists and therapists worldwide. Another issue that is frequently raised by busy practitioners is that MI oral care is more time consuming and a less efficient use of their time and skills when treating a large volume of patients. An appropriate amount of time should be offered to each patient and the healthcare system should embrace, encourage and reward this attitude. Not all patients will understand that taking responsibility for their oral health will add value to the quality of care and time taken during each visit. The solution to their dental problems does not lie with the 'drilling and filling' of their teeth and, as such, absolving them of any of any responsibility for their predicament. Unfortunately, this approach, at best, only postpones the problems with potentially more severe medium to long-term consequences. The real issue is that patients need to accept the consequences of their actions and the oral healthcare profession must take their critical role of communicating these effectively to the patients and documenting the outcomes of these discussions more proactively. Minimum intervention care is relevant to all specialities of dentistry, not just caries management in conservative dentistry.

The time has now arrived when an oral healthcare team not offering an MI approach to manage oral disease in their patients, and not explaining, discussing and documenting the material risks for each patient, could be risking dento-legal action against the individuals/practice.

Pursuing the evidence for the best clinical prevention and practice protocols is essential in order to maintain the highest possible moral and ethical standards when managing and treating patients. In MI oral care there is a relative paucity of randomised controlled clinical trial data available with large enough numbers and suitably controlled variables to reach any meaningful conclusions applicable to real-life oral healthcare practice. There is a need for more practice-based research networks populated by dentists and teams trained in delivering MI oral care to allow this information to be collected and studied so that the results can guide the best practice of the future.

The oral healthcare practice model used in the past will need to evolve and change as quickly as possible to support the MI practices of the future. The advent of specialisms means that there has been active encouragement to ensure that clinicians with the correct skills are looking after the appropriate needs of patients. The general oral healthcare practice must use the skills of their team effectively – nurses with oral health education certifications (extended duties dental nurses), hygienists, therapists and practice managers/reception staff must all be included to communicate the same MI message effectively. The dentist's role in this aspect of care delivery will be to coordinate patient-focused care and devolve various aspects of non-operative prevention and control to those whose time may be better spent working with the patient.

The real challenge will prove to be bringing the public on board through education and consultation but it must be a long-term goal. The promotion of the idea that maintaining oral health is a joint enterprise between the oral healthcare team and the patient rather than a traditional passive 'us and them' approach is key. There is no simple panacea for all oral/dental disease and a collective effort from both patients and the profession is essential. The three steps towards success apply here – give information, gain understanding and deliver results that satisfy patients.

Ultimately, it is now time to change clinical oral healthcare delivery. This paradigm shift towards an interactive, patient-focused team care approach requires coordinated active engagement from all stakeholders: the profession, public, dental industry partners and government/regulatory bodies. We must also work more closely with our medical colleagues to give the public one coherent message – to take responsibility for one's own oral and general health.