MDC BULLETIN

MALAYSIAN DENTAL COUNCIL

JAN-JUN 2020
VOL. 16 NO. 1
ISSN 18882-555

President's Message

Selamat Hari Raya and greetings to all dental practitioners.

The whole world has changed to a new normal since I last addressed the dental fraternity in this bulletin. We are now in the midst of the COVID-19 Pandemic, and continue to practise social distancing, frequent hand washing and isolation when necessary to prevent the spread of COVID-19. This pandemic hit us early in the year and is expected to be around for at least the next two years, hopefully in a less virulent and contagious form as time goes by.

Many private dental practitioners have been affected financially by the Movement Control Order imposed due to the pandemic and the subsequent economic downturn. I hope the various government economic aid packages were of some assistance. We now see the situation slowly improving, with the easing of the Movement Control Order to a Recovery Movement Control Order.

Dental treatment will cause very contagious situations for both the patients as well as the practitioners, due to the close proximity, compounded with the production of aerosols mixed with saliva and blood from the oral cavity. It is my fervent hope that all dental practitioners, be it in the private or government sectors, continue to be well informed on the precautions necessary to prevent the spread of COVID-19 in dental clinics and follow the available SOPs closely, to ensure the safety of everyone involved.

I know that many dental practitioners in the Ministry of Health and the armed forces have been involved as frontliners together with their medical colleagues in the screening and contact tracing activities of the Ministry of Health. Yet others have been involved in various ways in the production and distribution of Personal Protection Equipment for frontliners. I take this opportunity to express my gratitude to all those who have contributed to the control of COVID-19 and encourage you to carry on your good work.

Remember, practise the new norms and stay safe.

(TAN SRI DATO' SERI DR. NOOR HISHAM BIN ABDULLAH)

From the Editor's Desk

On behalf of the Editorial Team, I congratulate Dr. Noormi binti Othman on her appointment as Principal Director of Oral Health, Ministry of Health, Malaysia. In this capacity, she assumed the position of Registrar of the Malaysian Dental Council. She takes office during this challenging period of the COVID-19 Pandemic which will have a tremendous impact on dental practice. She has previously served as Secretary to the Malaysian Dental Council (MDC) and is therefore very familiar with the workings of the MDC.

This issue of the Bulletin features a pictorial tribute to Dr. Doreyat bin Jemun, the outgoing Principal Director of Oral Health, acknowledging his significant contribution to the advancement of the Oral Health Programme. We wish him a happy and well-deserved retirement.

In the Registrar's report it is interesting to note that there has been a steady decline in the number of new registrants over the last two years, from a peak of 1258 in 2017 to 1088 in 2019. The number of practitioners with Annual Practicing Certificates has almost doubled (83%) over a five-year period and currently stands at 10,817. Over 60% of them are locally trained and working in the public sector. The gap between the public sector and private sector employment of dental practitioners has remained somewhat constant at around 30%. As for location of practice, about 1 out of every 3 dental practitioners is practising in Selangor or the Federal Territory of Kuala Lumpur.

A major ethical consideration in dental practice is the need for dental practitioners to provide a high standard of care to patients, which is evidence based. As knowledge becomes outdated due to the emergence of new techniques and technologies, it is incumbent upon dental practitioners to keep themselves abreast with new knowledge and skills, in order to provide the best care for their patients. This issue of the Bulletin features the legislative controls in the use of radiographs and current developments in the field of endodontics. These articles also serve to remind dental practitioners that they need to seek out new knowledge and skills in order to remain competent in their dental practice.

Prof. Dato' Dr. Ishak Abdul Razak

MALAYSIAN DENTAL COUNCIL
Registrar's Report For 2019

Registration under the Dental Act 1971

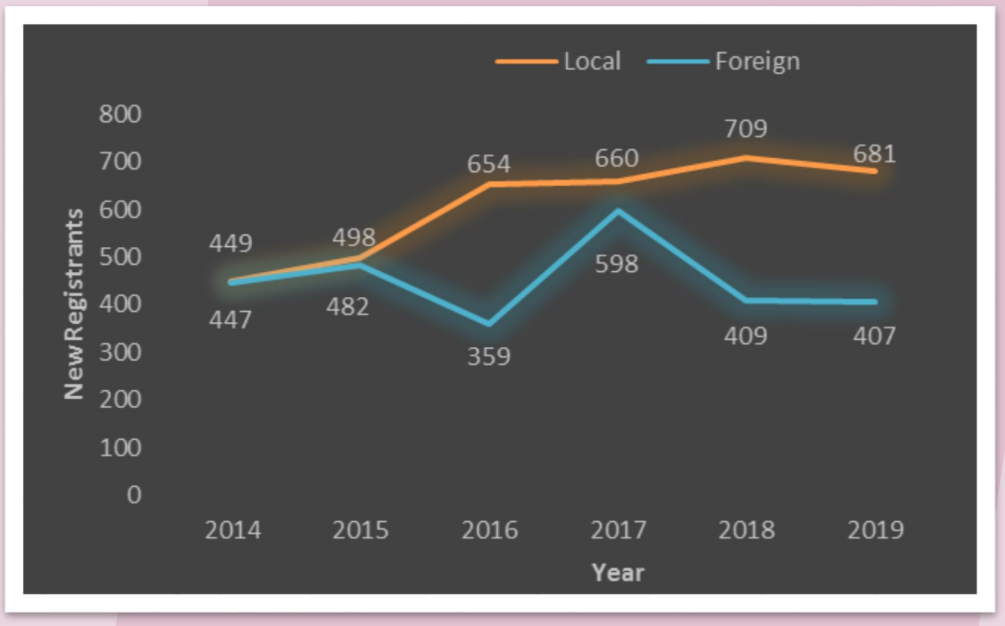
A total of 1,088 graduates registered with the Council in 2019 (**Table 1**), a reduction of 2.7% from the previous year. The majority of the new registrants were from recognized institutions and were registered under subsection 12(1) of the Dental Act 1971. Two dental surgeons were registered under subsection 12 (3) while nine other dental surgeons registered under subsection 12(9).

Table 1: New Registrants under the Dental Act 1971 by Section, 2014 – 2019

Section	2014	2015	2016	2017	2018	2019
12(1)	891	975	1,006	1,258	1,117	1,079
12(3)	1	0	0	0	0	2
12(9)	4	5	7	0	1	7
Total	896	980	1,013	1,258	1,118	1,088

There was a slight decrease in the number of local graduates. In 2019, 62.6% of the new registrants were from local institutions, a slight decrease from the previous year (**Figure 1**).

Figure 1: New Registrants from Local and Foreign Institutions, 2014 – 2019



In 2019, the local institution with the largest number of graduates who registered with the Council was the Penang International Dental College, followed by MAHSA University and AIMST University, all three of which are private institutions (**Table 2**).The number of graduates from private institutions who registered with the MDC was higher (57%) than the number from public institutions. This is because the focus of the public institutions is shifting to post-graduate training in support of the country's need for more dental specialists.

Table 2: New Registrants from Local Institutions, 2014 – 2019

Institution	Year					
	2014	2015	2016	2017	2018	2019
UM	75	75	70	65	55	55
UKM	42	35	71	52	50	50
USM	73	50	46	60	46	46
AIMST University	62	73	72	77	70	73
PIDC	28	73	75	75	76	78
UiTM	31	37	61	43	59	47
IIUM	37	37	60	47	64	53
USIM	28	24	35	37	30	42
MAHSA University	25	39	45	67	70	74
IMU	28	10	22	31	32	38
MMMC	19	45	73	62	77	70
SEGi University	-	-	24	44	47	47
Lincoln University College	-	-	-	-	33	8
Total	**449**	**498**	**654**	**660**	**709**	**681**

In 2019, the highest number of foreign graduates who registered with the Council were from Egypt, an increase of 80.2% from the previous year. Although foreign graduates from India were the second highest in number of foreign graduates in 2019, there was a marked decrease of 35.2% from the previous year. The other countries are as listed in **Table 3**.

In the Dental Register, the total number of registrants at the end of 2019 stood at 13,180.

Table 3: New Registrants by Country of Qualification, 2014 – 2019

Country	2014	2015	2016	2017	2018	2019
Malaysia	449	498	654	660	709	681
Egypt	79	179	80	253	91	164
India	207	147	121	191	122	79
Indonesia	96	49	59	41	74	75
Jordan	34	82	68	85	96	52
United Kingdom	11	10	7	14	13	11
Bangladesh	-	-	-	-	1	8
New Zealand	2	1	4	5	5	5
Australia	7	6	6	-	2	5
Taiwan	3	3	4	-	-	3
Republic of Ireland	4	4	4	7	4	2
China	-	-	3	-	-	1
Turkey	-	-	-	1	-	1
Pakistan	-	-	-	-	-	1
Myanmar	-	-	-	-	1	-
Singapore	1	1	3	1	-	-
Iraq	3	-	-	-	-	-
Total	**896**	**980**	**1,013**	**1,258**	**1,118**	**1,088**

Active Dental Practitioners

In 2019, a total of 10,817 dental practitioners were issued with Annual Practising Certificates (APC). A summary of the distribution of dental practitioners from 2014 to 2019 is shown on **Table 4**. The trend translates to an 82.8% increase in 'active' practitioners over the past 5 years. On the other hand, registered dentists, commonly known as Division II dentists, have been steadily declining as they retire from active practice. Since the year 2015, they have made up less than 0.5% of the active dental practitioners.

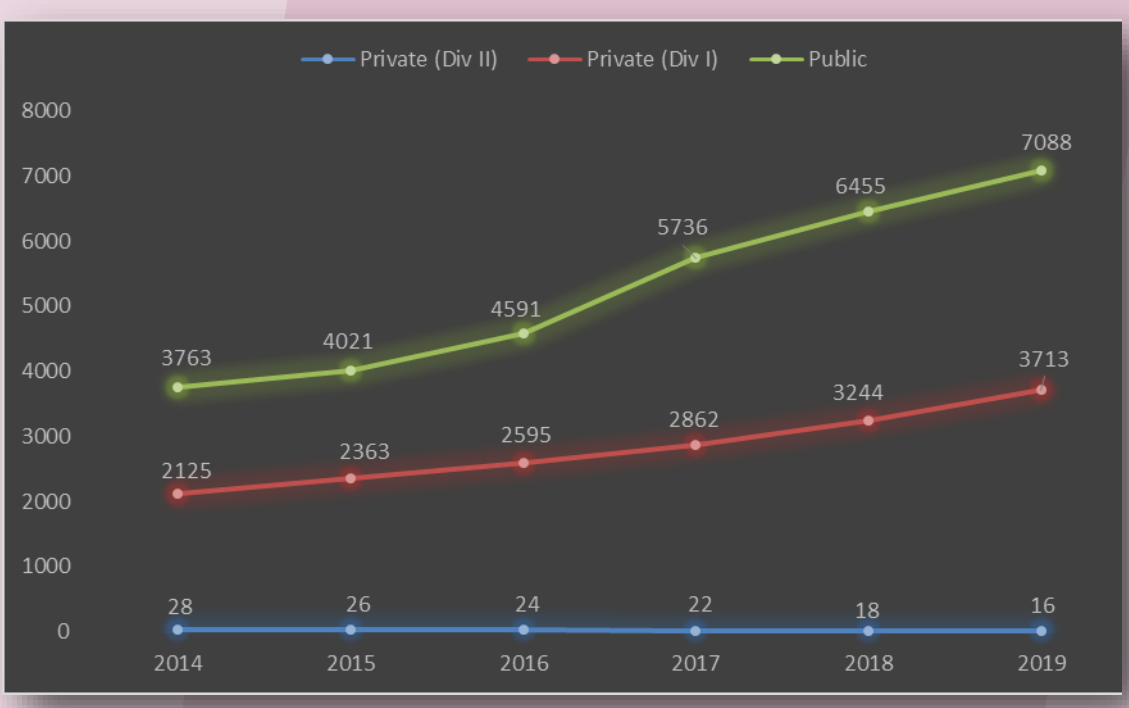
Table 4: Dental Practitioners with Annual Practising Certificates by Sector (2014 – 2019)

Sector	2014	2015	2016	2017	2018	2019
Div I - Public	3,763 (63.6%)	4,021 (62.7%)	4,591 (63.7%)	5,736 (66.5%)	6,455 (66.4%)	7,087 (65.5%)
Div I - Private	2,125 (35.9%)	2,363 (36.9%)	2,595 (36.0%)	2,862 (33.2%)	3,244 (33.4%)	3,714 (34.3%)
Total Div. I	**5,888**	**6,384**	**7,186**	**8,598**	**9,699**	**10,801**
Div II - Private	28 (0.5%)	26 (0.4%)	24 (0.3%)	22 (0.3%)	18 (0.2%)	16 (0.2%)
Total	**5,916**	**6,410**	**7,210**	**8,620**	**9,717**	**10,817**
% Increase	**12.4**	**8.4**	**12.5**	**19.6**	**12.7**	**11.3**

Distribution of Active Dental Practitioners by Sector

In 2019, the number of dental practitioners in the public sector (65.5%) was higher compared to the private sector (**Figure 2**). The increasing trend was due to the rising number of new registrants and the mandatory compulsory service in the public sector imposed on them under Section 47 and 48 of the Dental Act 1971. The one-year compulsory service is essential to enable graduates from different schools to acclimatize to the local working environment and the Malaysia Healthcare System. This will prepare them for independent practise in the future.

Figure 2: Distribution of Active Dental Practitioners by Sector (2014- 2019)



The distribution of active dental practitioners in Malaysia by state is shown in **Table 5**. Selangor had the largest number of dental practitioners, both in the public sector and in the private sector, followed by FT Kuala Lumpur, and together they account for 32% of the dental practitioners in Malaysia. In the private sector, 51.8% of the dental practitioners practise in Selangor and FT Kuala Lumpur. The distribution of dental practitioners in the private sector is largely based on demand and accessibility; while in the public sector it is based on the population and posts available in each state.

Table 5: Dental Practitioners with Annual Practising Certificates by States in Malaysia, 2019

State	Division I Dental Surgeons			Division II Dentists
	Public Sector	Private Sector	Total	
Perlis	148	13	161	-
Kedah	433	112	545	-
Penang	421	276	697	-
Perak	521	194	715	-
Selangor	839	1,202	2,041	-
FT Kuala Lumpur	708	744	1,452	-
FT Putrajaya	109	14	123	-
Negeri Sembilan	417	107	524	-
Malacca	328	103	431	-
Johore	656	444	1,100	-
Pahang	551	85	636	-
Terengganu	493	57	550	-
Kelantan	632	67	699	-
Pen. Malaysia	6,256	3,418	9,674	0
Sabah	375	155	530	7
Sarawak	421	137	558	8
FT Labuan	35	4	39	1
Malaysia	**7,087**	**3,714**	**10,801**	**16**

FT=Federal Territory

Distribution by Gender

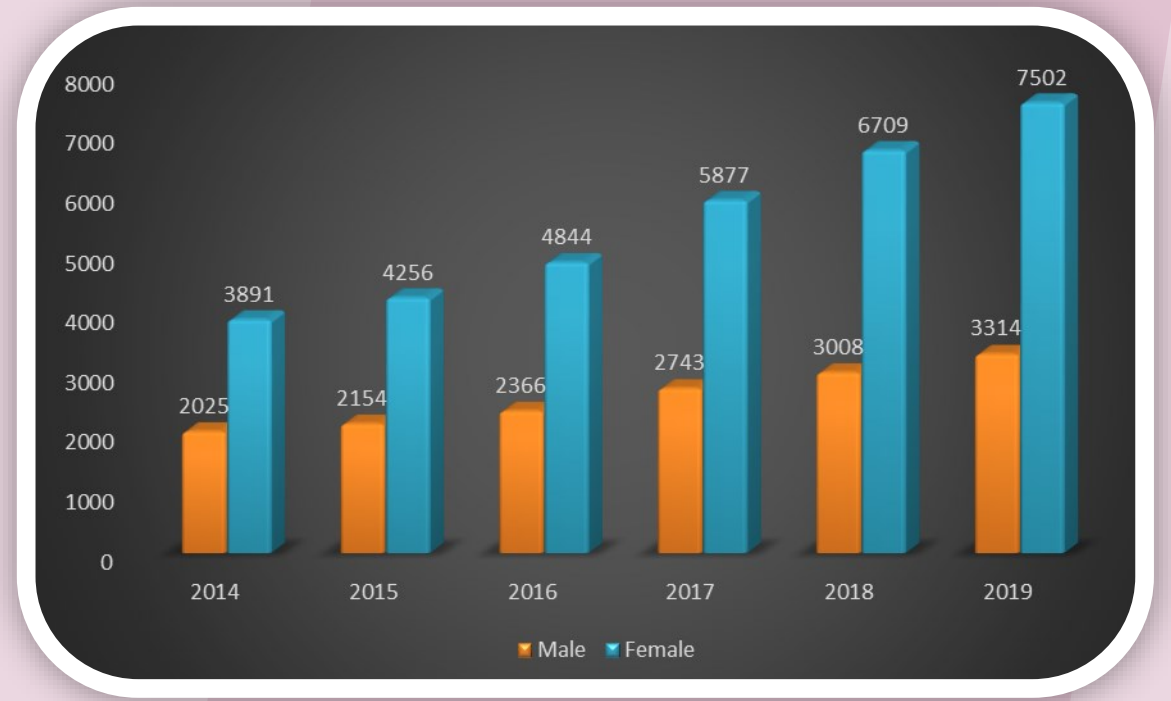
In 2019, slightly more than two-thirds (69.4%) of the active dental practitioners were females (**Table 4**). The gender distribution, however, varies by sector, with females accounting for 77.0% in the public sector, and only 55.0% in the private sector.

Table 4: Distribution of Active Dental Practitioners by Gender & Sector, 2019

Sector	Male	Female	Total
Public	1,629 (23.0%)	5,459 (77.0%)	7,088
Private (Div I)	1,671 (45.0%)	2,042 (55.0%)	3,713
Total Div. I	3,300 (30.6%)	7,501 (69.4%)	10,801
Private (Div II)	14 (87.5%)	2 (12.5%)	16
Total	**3,314 (30.6%)**	**7,503 (69.4%)**	**10,817**

A 5-year trend analysis showed that 'feminization' of the profession seems to be on the increase (**Figure 3**).Not only are the number of female dental practitioners more than the males, there has been a 92.8% growth in the number of females compared to only 63.7% among males since 2014.

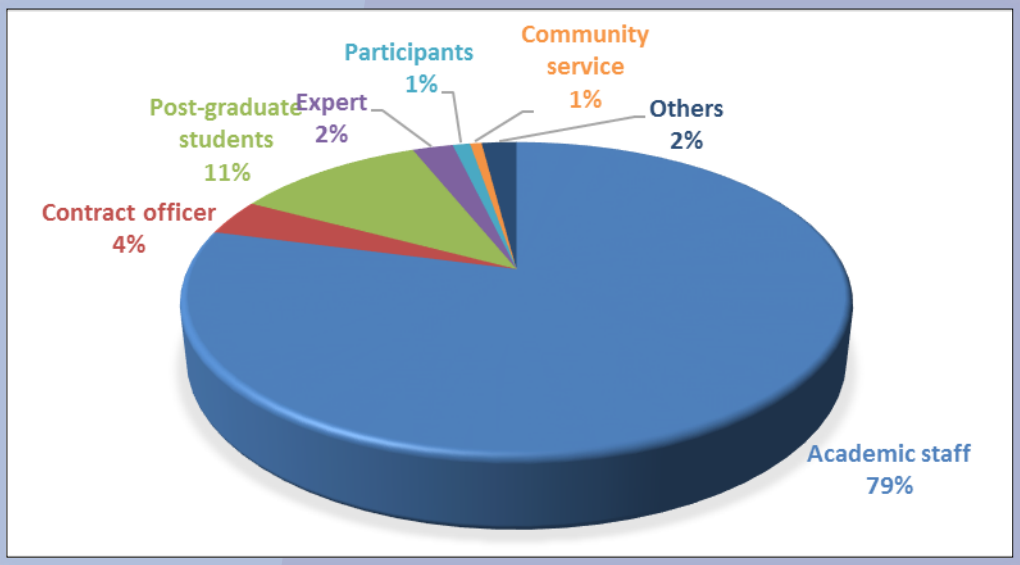
Figure 3: Distribution of Active Dental Practitioners by Gender, 2014 – 2019



Temporary Practising Certificates

In 2019, a total of 297 Temporary Practising Certificates (TPC) were issued to dental practitioners, who are registered outside Malaysia, to enable them to practise in Malaysia. The majority (79%) were issued to academic staff, and out of these 73.7% were issued to academic staff in private universities. Overall, there was a 16% increase in the number of TPC issued in 2018 compared to the previous year (**Figure 4**).

Figure 4: Temporary Practicing Certificates (TPC) Issued, 2019



The following are issues the Registrar wishes to highlight:

»»»Dental Act 2018«««

With the approval of the Dental Act 2018 and the dental regulations awaiting approval, the Council hopes that the Act can be implemented as soon as possible. Dental practitioners are advised to refer to the Malaysian Dental Council's website at http://mdc.moh.gov.my/on any updates on the implementation of the Dental Act 2018.

»»»APC applications«««

The APC application form can be downloaded from the MDC's website at http://mdc.moh.gov.my or http://dpims.moh.gov.my. Dental practitioners are **strongly encouraged to apply on-line,** and use the on-line payment options available for their 2021 APC via the Dental Practitioners' Information Management System (DPIMS).

Please note that for private dental facilities, the Council will only issue APC for facilities registered **under the Private Healthcare Facilities and Services Act 1998 [*Act 586*].**

»»»Dental Practitioners' Information Management System (DPIMS)«««

Applications for APC and other documents (Letter of Good Standing, translation of Registration Certificate and APC) can be made using DPIMS. Dental practitioners are advised to update their contact details in DPIMS, especially phone numbers and e-mail addresses to enable the MDC secretariat to contact them should there be any queries regarding their applications.

Please note that the system works best using the latest Internet Explorer browser version 8.0. All enquiries should be channelled to the helpdesk at **03-8318 6440**.

»»»myCPD2.0«««

Practitioners are encouraged to register with myCPD 2.0 at http://www.mycpd2.moh.gov.my/to record their annual CPD points collection. Please note that CPD points collected for the previous year must be recorded in the system the latest by end of January of the current year. Any CPD points collected and approved by a verifier in myCPD 2.0 will be automatically transferred to the dental practitioner's account in DPIMS.

All dental practitioners are reminded to keep their CPD records and relevant documents for at least five years for verification purposes.

Happy Retirement


1977 - Sekolah Alam Shah

PRIMARY AND SECONDARY EDUCATION

1972 - SK Bukit Gambir

1976 - SMK Bukit Gambir

DR DOREYAT BIN JEMUN's Farewell

BDS UM, 1986


MPH UM, 1997

Wishing you much joy & happiness as you begin a new chapter in your life.

SERVICES

1986-2010
Several dental clinics in Johore

2010-2013
Bahagian Kesihatan Pergigian, KKM

2013-2015
TPKN(G) Negeri Sembilan

2015-2017
TPKN(G) Melaka

2017-2018
TPKN(G) Johor

2019
Pengarah Bahagian Amalan & Perkembangan Kesihatan Pergigian, Program Kesihatan Pergigian

2019-2020
Pengarah Kanan (Kesihatan Pergigian)

Relax
Eat
Travel
Indulge
Read
Enjoy

THANK YOU

in appreciation
of you, and all that

LEGISLATIVE CONTROLS IN THE USE OF X-RAYS DURING ORAL AND MAXILLOFACIAL IMAGING

Prof. Dr. Phrabhakaran Nambiar
Department of Oral Biology and Biomedical Sciences
Faculty of Dentistry,
MAHSA University, Saujana Putra, Selangor

Associate Prof. Dr. Norliza Binti Ibrahim
Department of Oral & Maxillofacial Clinical Sciences
Faculty of Dentistry, University of Malaya, Kuala Lumpur

Dr. Soh Hwee Shin
Senior Assistant Director,
Medical Radiation Surveillance Division
Ministry of Health Malaysia, Putrajaya

It is quite obvious that nowadays dentists are overwhelmed by legislation; e.g. the Dental Act 1971, Private Health Care Facilities and Services Act 1998, Medical Device Act 2012, Factories and Machinery Act 1967, Uniform Building By-Laws 1984 By Local Authorities (signboard approval), Poisons Act 1952 (Revised 1989), Dangerous Drugs Act 1952 (Revised 1980), Sale of Drugs Act (Revised 1989), Personal Data Protection Act 2010. Legislation when using X-rays in dentistry should also be recognized.

The relevant act is the Atomic Energy Licensing Act 1984 (Act 304) and it applies throughout Malaysia. This act provides the basic law concerning the development and utilization of atomic energy and its safety regulations. Under this Act, the Director General of Health is the "appropriate authority" for licensing of X-ray machines for medical purpose as determined by the Atomic Energy Licensing Board Medical practitioners, dentists and veterinary surgeons are permitted to purchase and use X-ray machines for diagnostic purposes. Subsection 12(1) of the Act, states that without prejudice to the requirements of any other law, "no person shall: deal in, possess or dispose of any radioactive material, nuclear material, prescribed substance or irradiating apparatus unless he is the holder of a valid license". Furthermore, under the section on Conditions in Licences 17(1), "licences issued under this Act shall be subject to such conditions as may, be imposed by the appropriate authority which may in respect of the conditions imposed by it, add to, vary or revoke such conditions at any time".

Under this Act, another regulation for licensing was prepared for those eligible to possess, use, transfer, handle, sell or store irradiating apparatus and others who are qualified to install and

calibrate X-ray machines – the Radiation Protection (Licensing) Regulations 1986. In addition, the Ministry of Health is taking various steps to improve the quality of the radiological services and this is to ensure optimum diagnostic information with the least exposure to the patients. Quality assurance programmes to enhance safety, quality and efficiency in radiological services are compulsory under the Basic Safety Radiation Protection Regulations 2010. Furthermore, dentists should be aware that although guidelines or manuals issued by regulatory agencies are not mandatorily binding, they are used to support the requirements in order to comply with the acts and regulations.

In a preliminary effort to ensure that training requirements are met, the Medical Radiation Surveillance Division (MRSD) under the Ministry of Health (MOH) initiated mandatory attendance at courses in panoramic imaging (PI) and Cone-Beam Computed Tomography (CBCT) for dentists using these machines. All those involved with CBCT and PI must have received adequate theoretical and practical training for the purpose of radiological practices and relevant competence in radiation protection. PI has been in existence since the early 1960s, but CBCT has only been available in Malaysia a decade ago. The first machine was bought by Faculty of Dentistry, University of Malaya in 2007. Interestingly, the first CBCT machine came to existence in Italy in 1996 under the trade name NewTom. However, this machine scanned patients in the supine position and was very bulky, thus not being user-friendly. In the meantime, many other companies developed CBCT machines where the patient was required to be in the standing or sitting position. Subsequently, these became the preferred machines by many practitioners in the world, including in Malaysia. When these machines were introduced in Malaysia, the MRSD intended to classify them as conventional medical Computed Tomography machines. Objections were raised and documentations was provided to MRSD affirming that the X-ray radiation exposure was only 3% (at that time) of the medical CT for the same maxillofacial area. Subsequently the MRSD allowed the machine to be classified as a dental X-ray machine, to comply with similar licensing requirements for placement of a panoramic machine (concerning the aspects of room size, wall thickness etc.).

The CBCT course conducted at approved institutions (University of Malaya and MAHSA University) has a general introduction, with radiation physics and various methods of acquiring of digital images. Subsequent lessons are on equipment and theory concerning image acquisition (including different image detectors); various manipulation of scanned images; advantages and disadvantages of the CBCT imaging; main indications for the maxillofacial region; ascertaining the anatomical structures and understanding factors (artefacts) affecting image and troubleshooting any faults on CBCT images.

The panoramic course is much lengthier as there is a need to include a more comprehensive understanding of radiation physics. Other topic includes relevant principles and concepts in acquiring and interpretation of panoramic images; importance of positioning the patient's jaws in the focal trough (image layer); trouble - shooting errors in panoramic techniques; advantages and disadvantages of this technology: main indications of this imaging modality and the anatomical landmarks on a dental panoramic image.

In both instances, the dentist will be taught the practical aspects of acquiring the CBCT and PI scans with hands-on instructions. A certificate is

given as evidence of satisfactory completion of the course, and this has to be obtained prior to the application to MRSD for operating a CBCT or PI machine.

Dentists sometimes ask why the MRSD imposes such strict requirements. When compared to most other countries, MRSD is, in fact, quite lenient. If we study the requirements of the College of Dental Surgeons of Ontario (similar to a report prepared by the European Commission SEDENTEXCT project), all dentists who wish to prescribe, order and take CBCT scans must register with the College as a prescribing dentist and must successfully complete a theoretical and practical training programme. Moreover, training for use of CBCT is dependent on the scanner – whether it is a dentoalveolar or craniofacial CBCT scanner. Dentoalveolar scanners have a field of view (FOV) of 8 centimetres or less. Such a small field of view is useful for imaging the teeth and their supporting structures only. This training can be undertaken by a general dentist. However, a craniofacial CBCT scanner with a field of view of over 8 centimetres may only be used by oral and maxillofacial radiologists and those oral and maxillofacial surgeons who have completed a mentoring programme with an oral and maxillofacial radiologist or qualified medical radiologist. In Malaysia however, there is no issue on the FOV sizes to be used by general dentists.

Recently a new manual to implement the quality assurance programme for dental radiology is being prepared for those who use intraoral dental X-ray machines, panoramic machines and CBCT machines. Under section 53. (1) of the Atomic Energy Licensing (Basic Safety Radiation Protection) Regulations 2010, it is stated that: "In addition to applying the relevant requirements for quality assurance under this Part, the licensee shall establish a comprehensive Quality Assurance Programme (QAP) for medical exposure with the participation of appropriate qualified experts in the relevant fields as specified by the appropriate authority". Under this regulation, the QAP programme proposed includes, indicator, quality control tests on radiation and continuous professional development (CPD).

The indicator category specifies whether an image is: (1) of excellent quality (2) is of inferior quality but diagnostically acceptable and (3) to be rejected altogether, whereby implying there should be a retake of the image due to operator or processing error. In view of the reject and retake performed, a recording of these has to be undertaken annually and will have then be forwarded to MRSD. It was proposed that the number of retakes should be less than 10% for conventional films & photo stimulable phosphor plates whereas for a CCD (charge-coupled device) & CMOS complementary metal-oxide-semiconductor) it should be less than 20% of the annual exposures undertaken on the patients. As with regards to quality controls, it is known that purchase of dental X-ray systems must follow the specifications of the MOH and commissioning of these machines would need to be performed by qualified personnel who are Consultant Medical Physicists with a Class H licence. Moreover, the machines need to be calibrated every three years and the report should be submitted to MRSD within one month.

With regards to Continuous Professional Development, CPD), it was agreed that all dentists will have to undertake a cumulative of 5 hours of learning or training every 3 years in the following topics (with their related subtopics):

1.1 Legislations and Regulation related to Act 304

1.2 Safety and Awareness in Radiation Protection.

1.3 Management of the Quality Assurance Programmes.

1.4 Working of the X-ray machines and their Related Services.

1.5 Clinical Practice and Radiography /Imaging Techniques.

1.6 Interpretation of Clinical Images and the Criteria for Image Quality.

1.7 Recent Advances in Imaging Modalities.

Evidence of attendance at courses in the form of certificates or list of attendance (which had prior approval by MRSD and endorsed by the organiser or Head of Department (government facility)) should be submitted. It is worth noting that dentists will be able to fulfil the 5 hours training as dentists have to attend conferences where courses or lectures (regularly) have the requirement of interpretation of clinical images.

Recently there was a new development to train health care practitioners to become Radiation Protection Officers (RPO) exclusively for health related facilities. The MRSD is in the process of preparing the "syllabus and the required standards" for, not only medical and dental practitioners, but also radiographers. A radiation Protection Officer develops measures to protect people and the medical or dental facility, and monitors implementation and maintenance of programmes to ensure safeguards when using ionizing radiation. While, many would ask this question: "If I am a certified RPO, can I supervise all the dental clinics in my town?" The answer is a blatant "NO". According to the authorities at MRSD, a RPO can take care of only two premises.

The authors wish to state categorically that what has been shared here is to create awareness amongst fellow dental colleagues so as to be prepared for requirements enacted by the Ministry of Health. Any misinterpretations or lacking of accuracy or completeness should be considered as an oversight and the authors shall not liable for the errors.

References:

i. Laws of Malaysia- Atomic Energy Licensing Act 1984 (Act 304).

ii. Radiation Protection (Licensing) Regulations 1986; under Atomic Energy Licensing Act 1984.

iii. Atomic Energy Licensing (Basic Atomic Energy Licensing Act 1984. Safety Radiation Protection) Regulations 2010; under Atomic Energy Licensing Act 1984.

iv. Frequently Asked Questions, College of Dental Surgeons of Ontario, Canada. https://www.rcdso.org/en-ca/searchresults?q=Conebeam%20ct&s=all

v. J Brown, R Jacobs,E Levring Jäghagen,C Lindh,G Baksi,D Schulze, and R Schulze. Basic training requirements for the use of dental CBCT by dentists: a position paper prepared by the European Academy of DentoMaxilloFacial Radiology. Dentomaxillofac Radiol. 2014 Jan; 43(1): 20130291.

vi. Guidelines To Obtain Class C License Under the Atomic Energy Licensing Act 1984 – 1994.

vii. European Commission. Radiation protection no. 172: cone beam CT for dental and maxillofacial radiology. Evidence based guidelines. A report prepared by the SEDENTEXCT project.

PARADIGM SHIFT IN ENDODONTICS

Dr. Siew Kai Ling and Dr. Saw Lip Hean

The progress in science and technology has enabled endodontic treatment to be conducted with better predictability and improved outcomes for the past decade. It is stressed that alongside the advancement in technology, the 3 Ts, namely training, technique and technology are essential to ensure success in endodontic treatment. This article will highlight the latest techniques in endodontic treatment, its pitfalls and indications.

Magnification

One of the most useful advancements in endodontics is the dental operating microscope (DOM). The enhancement of vision and visibility improves precision in dental treatment and enables accurate diagnoses to be made. For example, the diagnosis of a cracked tooth and its extent cannot be made without the help of a DOM (Fig.1 to Fig 3). The prognosis of the cracked tooth can be accurately discussed with the patient after in-depth examination and proper documentation.

Fig 1: Photograph of crack line that has extended across the pulpal floor in a maxillary first molar under the DOM

Fig 2: Photograph of an oblique crack line at the cervical third of the palatal root of a maxillary premolar

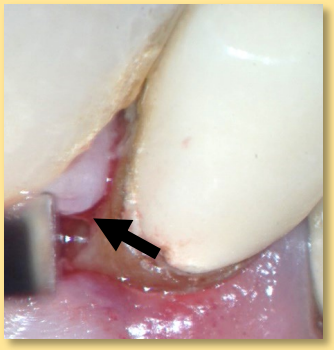


Fig 3: Photograph of a crack line on the root surface (vertical root fracture) in a tooth with failed root canal treatment

Besides the diagnosis of cracks, the use of a microscope allows the predictable removal of separated instruments from the canal. The exposure of the coronal portion of the separated fragment and selective troughing of dentine to loosen the separated instrument bound to the canal wall are essential for its removal. (Fig. 4 to Fig. 6)

Fig 4: Pre-operative periapical radiograph of 46 with 2 separated instruments in the MB and DL canals respectively

Fig 5: Post-operative radiograph of 46 with both separated instruments removed

Fig 6: Photograph of a separated instrument in the apical third of the canal

Other than the above mentioned treatment modalities, its use in surgical endodontic treatment, C-shape canal configuration, identification of MB2/additional canals, apexification/revascularisation and in perforation repair are widely recognised (Fig 7 to Fig 9).

Fig 7: The presence of DB canal in an upper maxillary premolar

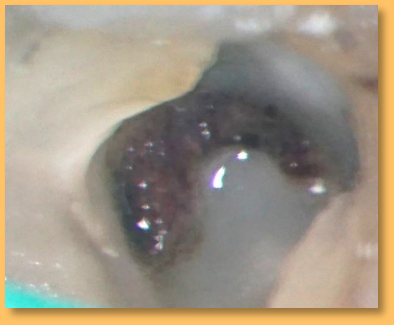


Fig 8: Photograph of a C-shaped canal configuration in a lower second molar

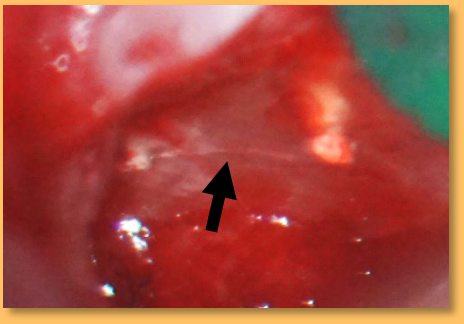


Fig 9: Surgical endodontic treatment that reveals the presence of an isthmus between the MB1 and MB2 canals

Although the use of the DOM is strongly advocated in endodontic treatment, it is not without its constraints. It is believed that the learning curve is not only steep, but one should also use it consistently to perfect the skill.

Cone Beam Computed Tomography (CBCT)

The introduction of CBCT in the field of endodontics has aided substantially in treatment planning and diagnosis. It has overcome the limitations of 2-D radiography. It is commonly indicated when the clinician needs to evaluate (1):

1. Differential diagnoses (eg. Lesions of endodontic or non-endodontic origin, diagnosis of failed endodontic treatment)
2. The presence of unusual anatomy and complex tooth morphology (eg. Dens in dente Class 3)

3. Intra-operative or post-operative assessment of endodontic treatment complications (eg. separated instruments)
4. Dento-alveolar trauma
5. Internal and external root resorption
6. Pre-surgical planning
7. Assessment of endodontic treatment outcomes

The use of CBCT must be determined on a case-to-case basis, these indications do not in any way mandate the use of CBCT, even when a case falls into one of the preceding categories[(1)]. No patient should be subjected to unnecessary exposure to higher amount of radiation, if the case can be diagnosed with 2-D radiography.

Below are examples (Fig 10 to Fig 17) in which CBCT has helped in the diagnosis of complex endodontic cases.

Fig 10: Dens invaginatus in tooth 22

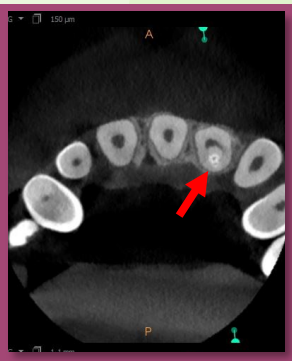


Fig 11: Axial view of tooth 22

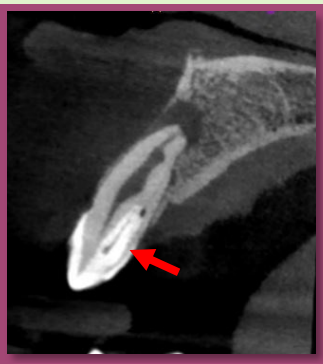


Fig 12: Sagittal view of tooth 22

Fig 13: Post-operative radiograph of 22

Fig 14: Pre-operative radiograph of 24

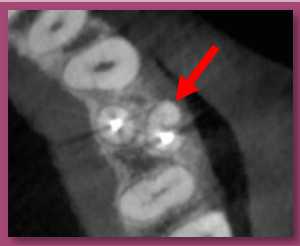


Fig 15: Axial view of tooth 24 showing missed MB canal

Fig 16: Sagittal view of 24 showing missed MB canal

Fig 17: post-operative radiograph of 24

Regenerative endodontic

The management of immature permanent teeth with pulpal necrosis is challenging, owing to the thin root canal wall, with high susceptibility to future cervical fracture and the difficulty in achieving a good apical seal in an open apex. Regenerative endodontics uses the concept of tissue engineering to restore the root canals to a healthy state, thus allowing for continued development of the root and surrounding tissues. Biologically, the presence of stem cells, scaffolds and growth factors are important. Clinically, adequate disinfection of the canals, the presence of blood clot in the canal and the placement of a good

coronal seal are imperative for treatment success. The only limitation for this procedure is that the follow-up for such cases is mandatory and the growth of the roots takes years to complete[(2)] (Fig 18 to Fig 23)

Fig 18: Pre-operative radiograph of tooth 21 with immature apex

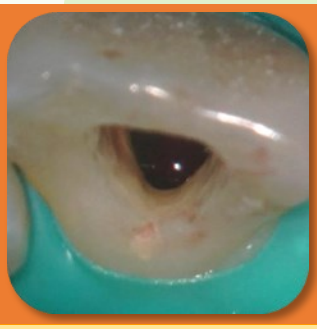


Fig 19: Blood clot induced in the canal

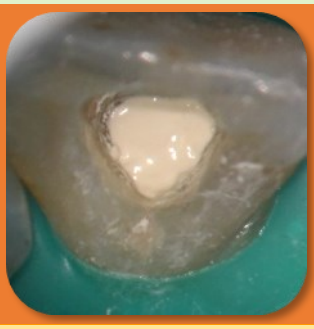


Fig 20: Bio-ceramic cement placed on top of the blood clot

Fig 21: Post-operative radiograph of 21

Fig 22: 6 months review showing continued root growth

Fig 23: 1 year review showing almost complete root growth

References:

1. Madhu K. Nair et al: Radiographic interpretation; Cohen Pathways of the pulp 11th edition, Chapter 2; pp 33-70
2. American Association of Endodontics: Regenerative Endodontics, Issue Spring 2013

The Editorial Board invites feedback and suggestions regarding this publication. Please use the e-mail address below for correspondence.

Views expressed in this Bulletin are those of the Editorial Board and does not necessarily reflect the opinions of the Council.

CONTACT US
Malaysian Dental Council
E301, Level 3, Block 3440
Enterprise Building 1
Jalan Teknokrat 3
63000 Cyberjaya
Selangor

Tel: +60(3) 8318 6440
Fax: +60(3) 8318 6121
E-mail: mdc@moh.gov.my
Website: http://mdc.moh.gov.my