

## Transforming dental radiologist to diagnostic and interventional imageologist: A Short Communication

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### Abstract

The continuous and rapid development in the field of radiology has taken revolution with the discovery of X-rays by Roentgen. In the 21<sup>st</sup> century, more advancement in imageology put forward the transformation of radiologists from diagnostic imaging to in the field of therapeutics. In the present article we are putting a small update with review of literature how dental radiologists transforming from diagnostic to interventional radiologist.

**Keywords:** Diagnosis, Interventional Imageologist, Imaging, Radiology.

### Introduction

A radiographic image is the 2-Dimensional or 3-Dimensional representation of a real or original object. The interpretations of these images, however involves many unseen thought process and levels of sophistication only the brain can contrive. Revolution was taken with the discovery of X-rays by Roentgen and paved the way for “looking inside” the body from outside. Indeed, the X-rays has given more access to every nook and corner of the human body and continues to be the cornerstone of many imaging modalities.<sup>(1)</sup>

There is continuous and rapid change in various techniques in the pattern of advancement in radiology, imaging science and intervention radiology from research lab to clinical practice over this phase of time. Radiology became a most popular speciality branch in the field of medicine and the most preferred branch by many top-rankers in India for almost a decade. The reasons behind is diagnostics have become an integral part of most patients and for those doctors practicing evidence based medicine. More importantly, rapid growth of knowledge and development of new technology with advanced equipments in imaging have further added its demand universally.<sup>(2)</sup> In diagnostic centres, when compared to general radiologist, the dento-maxillofacial radiologist (DMR) are less preferred, but in recent years with rapid growth in new advancement in dentistry, DMR is gaining a popular place equal to general radiology.

DMR is one of the speciality branches of dentistry, recognized under different names and divisions by around 40 countries worldwide. Due to its tremendous role in clinical dentistry, it was adopted in early 1900s and developed the faculties and engaged in teaching in oral radiology.<sup>(3)</sup>

The diagnoses of pathological diseases prior to treatment is the cornerstone of dental practice, and with the development of recent advanced imaging science such as Digital Imaging, Cone Beam Computed

Tomography (CBCT), Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Ultrasound etc. have succeeded to provide much better diagnostic services to their patients. All these techniques are now part of the armamentarium of the dentist, largely through the work of oral and maxillofacial radiologists in day to day clinical practice.<sup>(4)</sup> Explosive growth of knowledge, development of new imaging science in dentistry and its role in diagnosis of oral and maxillofacial diseases have been the result of efforts in this specialty, making it a more specialized branch of dentistry. American Dental Association recognized it as separate specialty branch in dentistry.<sup>(4)</sup>

In India DMR with oral medicine is a 3-years duration residency training programme and every resident is imparted training in both conventional imaging such as intra-oral imaging, panoramic imaging, cephalometric imaging and advanced imaging science such as digital imaging, CT, CBCT, Ultrasonography, positron emission tomography (PET), MRI and nuclear medicine to make them well versed with broad discipline of radiology.<sup>(5,6)</sup> In addition, visible light, optical coherence tomography (OCT), and terahertz imaging are other methods in use or under development.<sup>(7)</sup>

An intraoral imaging method provides a good spatial resolution compared to extraoral imaging modalities in dentistry. Panoramic radiography is a commonly used two-dimensional imaging technique in dentistry which gives the broad view of both jaws, which was not offered by the intraoral images. To overcome the disadvantages of 2D imaging modalities, the CT which is a 3D imaging technique has come into existence. But in recent years, with arrival of CBCT in 2000s in dental market was a revolution in dentistry and marked the beginning of a new era in the field of DMR and almost replaced CT, as CT has higher radiation dose and is expensive compared to CBCT.<sup>(8)</sup>

The main goal of the DMR training is to develop a competent, safe and logical radiologist, who can

perform and interpret various diagnostic and interventional imaging studies, and also able to pursue teaching and research activities, while following medical ethics and consumer protection act.<sup>(9)</sup>

Radiological practice over the years went on one sided, as armchair radiologist and in the eyes of public and even for educated medics was just technician who study films and predict some diagnosis. The radiologist's role was one of pattern recognition, saying a lesion is present without giving a definitive pathological diagnosis. But this pattern was replaced with today's radiologists where reporting to a comprehensive clinical imaging assay, giving information at a level profound enough to be useful for research people working in various allied fields.<sup>(10)</sup> Some fundamental clinical decisions have to be taken quickly such as in trauma, cardiac strokes and other medical emergency cases where in imaging plays a key role in further management.<sup>(11)</sup>

With the advancement in imaging science, it is an easy and non-invasive method to evaluate the extent of the disease spread, a complex and diversified multisystem diseases diagnoses such as lung, brain, liver, and heart where tissue biopsies may not be feasible, curative aspirations and minor surgical procedures are done under the imaging guidance.<sup>(11)</sup> The high successful rate of today's clinical practice depends on well-established imaging techniques, good interpretation of the image with clearly defined anatomical as well pathological correlations, for this the radiologist should be kept up-to-date knowledge. Keeping pace with expanding knowledge as well rapid growth in imaging science makes a major challenge to them.<sup>(12)</sup>

At present the radiology/imageology is advancing rapidly in medicine, as such advances have elevated from diagnostic imaging to the level of therapeutic purpose and maintains its role in integrating the various disciplines of medical care. As well the radiologist must be a competent generalist prior to any specialization.<sup>(1)</sup> Earlier the radiation only meant for diagnostic (diagnostic radiology) purpose, but rapid change in the development of imaging science and various techniques the radiations used for both diagnostic as well as therapeutic (interventional radiology) purpose for managements of various diseases.<sup>(1)</sup> Interventional radiology (IR) became so popular that, used with minimum invasively to treat several diseases such as minor vascular problems associated with brain, kidneys, central and peripheral vessels, requiring surgeries where conventional surgery is not feasible, can be done by using highly available precision gadgets allow entry to surgically inaccessible areas.<sup>(13)</sup> Another major advantage is that most of interventional radiological procedures can be repeated many times over already treated areas. IR has raised imaging to new heights where intrauterine interventions are now done to correct fetal abnormalities as soon as they are detected.<sup>(11)</sup>

But science, scientific education, medical practice and imaging science are evolutionary processes that require constant tuning, refinement and overhaul of its faculties by continuing medical education programs held in various sub-specialities, periodically to enrich knowledge and skills of practicing radiologists. The imageologist apart from being adept in his chosen field requires equipping his mind with physician, a surgeon, a pathologist and an effective therapist, and then only he can make efficient use of the advanced technological marvels at his disposal, upgrade with knowledge, utility and contribute to the advancement of imaging science. An eclectic mind is in the best interest of any scientific profession so long as it does not encroach into another's territory; because in imageology, more than any other field, the eye does not see what the mind does not know.<sup>(14)</sup> Radiological practice with a flawless clinical attitude and aptitude alone will thrive in a ruthlessly competitive world and help maintain the pivotal role radiology has in integrating the various disciplines involved in medical care.

Despite all these developments, there are certain issues which require more attention in our system like hazards of radiation or minimizing the radiation while practicing radiology and implementation of quality assurance parameters. The development of modern radiology services in some low standard institutes and rural areas of the country will take our branch a step ahead in this modernising era.<sup>(2,15)</sup>

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