

Challenges and Areas for Future Research in Oral Medicine and Radiology

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Abstract

Objective: To review the current status of the practice of Oral medicine and radiology in the Indian context and suggest the areas for improvement and research in future. **Methods:** This article is a narrative review derived from the experience of a senior academician, with excellent contributions as a teacher, administrator and policy maker in the field of Oral medicine and Radiology. An attempt to systematically and concisely present the challenges and scope for future research internationally and in Indian scenario has been made. A review on currently available systematic reviews has been attempted in the article wherever relevant. **Conclusion:** This article will help the present policy makers and academicians to take oral medicine and radiology to higher levels of achievements.

Key Words: Oral Medicine, Oral Radiology, Challenges, Research

Introduction

Oral Medicine and Radiology as a speciality was introduced into the dental curriculum for the first time in India in the year 1971 at the Government Dental College, Bangalore. The practice of this speciality has seen huge improvements and advances in the last 46 years. This subject is now taught as a speciality in more than 300 dental colleges teaching the undergraduate course. About 150 dental colleges have a sanctioned strength of more than 500 students per year to study this subject as a post-graduate speciality¹. It has also been witness to a lot of challenges. In the initial days, there was a shortage of trained faculty to guide students in this subject. Presently the situation seems to have reached a self-sufficient stage. Hence, it is now time to look for efficiency and growth in this speciality by

looking up to widening the scope and ensuring the application of the subject, thus establishing the authority of the oral medicine and radiology specialist in the field of medical sciences. This paper tries to put the forth the challenges being faced by the specialist and suggests a pathway for future research in this field.

Oral Medicine

The Indian subcontinent is unique not only because of the huge population and subsequent high incidence of disease but also because of the variety of cultural and lifestyle patterns practised in this subcontinent. The racially mixed population behaves in a totally different way and hence standard protocols and guidelines formulated on populations based studies other parts of the world should not be applied without testing it on our population. For the convenience of the readers, we have selected a few of the most important and broad areas which pose a challenge and provide scope for future research in the Indian context.

Oncology

Oral cancers and tobacco-related lesions of oral cavity have a major impact on society related health burden in India. The role played our speciality in the day to day practice is restricted to predominantly referring the patients to appropriate tertiary centres. Very few of our speciality members are associated with a team managing oral oncological lesions. The data related to prevalence and incidence of potentially malignant (PML) and malignant lesions of the

oral cavity is anybody's guess. We do not have any system for recording and sharing these population-based parameters. No major oral cancer screening programs have been initiated nor have there been any initiatives at policy making level to institute comprehensive and effective laws to help to prevent the occurrence of such diseases. The following could be included in the objectives for improvement in future

- Calculating the population-based data for incidence and prevalence of potentially malignant lesions of the oral cavity and oral malignancies. Dental schools all over India may be asked to adopt specified areas of the country to conduct a survey in a fashion similar to recently concluded National Mental Health Survey conducted by National Institute of Mental Health and Neurosciences²
- Validation and implementation of screening methods for potentially malignant lesions. A wide variety of screening tools is now available in the scientific arena. Ranging from self-oral examination, examination by trained novices, vital tissue staining, use of specific tools, to telemedical intervention there is an abundance of methods available, each of which claims to be best among the group. Assessing their sensitivity and specificity and then applicability to mass screening process is the need of the hour
- Trial based assessment of the efficacy of intervention and therapeutics for the PMLs. Even after decades of recognition and defining of PMLs the controversy regarding management of these is not yet settled. The PMLs form a very critical level for intervention and hence randomised controlled trial based studies for effectiveness of these interventions has to be taken up
- The inclusion of oral medicine specialists in oncology management teams: this may be achieved by increased importance for training the post graduates in this field,

and exposing them to planning chemotherapy, radiotherapy and complications arising from such interventions

- The oral medicine specialist can also play a key role in the management of post chemo/radiotherapy patients undergoing treatment for other cancers affecting the body

Dental Management of Medically Compromised and Geriatric Patients

With an increase in life expectancy as well as improved medical health care facilities, the number of ambulatory patients with medically compromised status seeking dental care has also increased. There is a dearth of experts in dealing with the following aspects of patient care.

- Active management of dental issues in an out-patient setting
- Management of patients as part of team managing medically compromised at a hospital in-patient setting
- Palliative management of dental issues in terminally ill patients

Systematic Profiling of Adverse/Side Effects of Medications on Oral Cavity

The existence of drug-induced salivary gland disorders is an accepted fact by all of us. But a recently published systematic review, by the members of World Workshop on Oral Medicine VI (WWOM VI) on medication-induced salivary gland diseases revealed there is very minimal high-quality evidence on the effect of drugs on Salivary glands^{3,4,5,6}. Most of the reports of drug-induced oral manifestation either rely on patient reporting of adverse effects or information on the drug labels. Very few randomised controlled trials have been conducted with an assessment of oral manifestations of systemic medication, as one of the primary objectives. Oral health forms an important measure in determining the quality of life of a person and hence the effect of drugs

plays a vital role in assessing the same. Hence this issue needs to be assessed and published in the public domain.

Autoimmune Disorders Affecting Oral Cavity

Oral non-microbial origin ulcerative and vesiculobullous lesions have mostly been treated with either steroids or immune-modulators from a long time. A standard protocol on the hierarchy of choice and usage of these drugs has not evolved yet. A Cochrane review published in the year 2011 found no randomised control trials (RCT) were available as a reference which compared the use of steroids/or other interventions with that of placebo for treatment of Lichen Planus or Oral lichenoid reactions⁷. Similar has been the condition of other diseases of autoimmune origin of oral cavity^{8, 9}. Thus organising multicentre RCT for interventions and follow up on a reasonable long term is required.

Forensic Dentistry

This branch of dentistry has been claimed to be a part of many branches of dentistry. It is imperative for our speciality to involve in the development of evidence-based protocols for recording and assessing forensic details. As this is relatively more recently developed branch in comparison to other branches of dentistry there is a lot that may be ventured into for benefit of human race.

Developing a Clinical Simulator

Students in undergraduate courses are posted on an average for a few months and post graduate course for three years. Based on the demographic location of the dental school the range of the patients and types of diseased conditions seen by the student in a limited period of time is very small. It would be ideal to involve the specialist from information technology forums to design a clinical simulator software program for training students of the undergraduate and postgraduate level to gain better communication, didactic and inferring skills. A detailed review of the existing situation is mentioned in the article published by WWOM VI¹⁰.

Online Teaching Modules

One of the least applied but highly efficient is the use of online lecturing mode and making these recorded lectures available for offline reference by all the members of the fraternity. By using this mode most eminent specialists nationally and internationally, may be invited to present their lectures without actually wasting resources on various organisational issues. High-speed internet availability in most parts of the country can be used for video conferencing and hence create an invaluable compilation of teaching resources database. By allowing live interactions with people from different parts of the globe, exchange of thoughts and ideas would be more fruitful.

Oral Radiology

The advent of Cone Beam Volumetric Imaging (CBVI) and penetration of other advanced imaging into semi-urban parts of our country, our speciality has to undergo a comprehensive review and restructuring to suit to present day needs.

Clarifying and Establishing a Protocol on Choice of Imaging Modalities in Maxillofacial Diagnosis

As age old saying goes "with great power comes great responsibilities", with so many imaging modalities available in our investigative quest, there is an immediate need to understand the advantages and disadvantages of using each one of them by conducting systematic research. Technological advances, on one hand, provide an added edge in diagnosis but at the same time need to be judiciously used so as to minimise the side effects if any of the procedure. Many international associations have suggested guidelines based on the availability applicability and affordability of resources. Hence there is need to conduct research to establish an evidence-based standard operating protocol for benefit of our speciality in specific and dentistry in general for India.

Establishing Standards for Quality Assurance for all the Imaging Modalities

Developing technology has yielded more

affordable machines and improved financial situation of practising dentist has resulted in the use of panoramic radiology, extra oral radiology, intraoral radiology in increased numbers. There are no maxillofacial imaging specific standards for assuring the quality of these devices. The standards applicable to general radiology machines may either be too strict or too lenient on different aspects in the context of maxillofacial imaging. Though such guidelines have come up from European Commission¹¹ and International Commission Radiation Protection¹² they need to be modified and adapted to suit Indian context. A beginning has been made in this direction by the Atomic Energy Regulatory Board in India, it has a long way to reach the standards set by other countries. Active participation by the members of our fraternity will help in quickly achieving this goal. There is no system to assess the veracity of the claims of the manufacturers on the exposure parameters and health effects of the same.

Digital Registry for Recording Radiographic Features of Various Lesions

Need to develop a digital registry for recording the radiological features of various diseases both in two-dimensional and three-dimensional formats. The increasing ease of access to three-dimensional imaging with the advent of CBVI has ushered in a need to upgrade radiological features of various lesions of the maxillofacial region. Classifying diseases based on radiological appearances of the borders, locularity, content may be supplemented by descriptive analysis of lesions in terms of digitally calculated texture; homogeneity etc. These may help us in characterising and classifying lesions more accurately. We are all aware that a single isolated case of ameloblastoma or dentigerous cyst never makes into a publication of a good impact factor journal. But the vast number of patients presenting with these diseases, if recorded in a digital registry, can help us arriving at digitally derived features, which will be a very useful data all over the world. Hence there is need to finalise a consensually agreed common format for reporting features of various diseases after standardised investigations diagnostic methods.

Indigenous Software for Image Management

The need for indigenous image management software for using and analysing three-dimensional data which is custom made for dental application, affordable and universally applicable is being felt with the influx of CBVI in dental setup. The manufacturer based software restrict the user from applying images to a bare basic level of application, and for advanced applications, the software is too expensive to be used for the general application. The complete use of voluminous data derived from a tomographic scan cannot be achieved on a large scale unless we develop indigenous software of the above-mentioned prowess. The reliance of dentist on manufacturer supplied software would be greatly reduced with this. Development of indigenous software would also help us in extending the application of the same for all the three-dimensional printing and planning needs. The treatment planning in orthodontics, as well as implantology, would benefit immensely with the indigenous blending of CAD/CAM and the imaging possibility with the clinical competence of clinicians.

Review of the Post Graduate Syllabus

Oral medicine and radiology enable a specialist to systematically diagnose and manage diseases of oral and paraoral structures. They are expected to be well versed with identifying the oral manifestations of systematic diseases and management of medically compromised patients. The increase in the number of investigation modalities, a few of them which are exclusive to the oral region, has necessitated the need to comprehensively review and systematic restructuring of the present post-graduate syllabus. The following points could be the broad outline forming the objectives of such a task.

- Establishing the scope of oral medicine and radiology specialist in the field of general medicine and general radiology.
- Defining the role of an oral medicine and radiology specialist.
- Designing a structured curriculum with dedicated emphasis on a hands-on

approach to learning the use and application of latest technological advances.

- Effective co-ordination and interaction with different specialists in the medical forum like internal medicine, dermatology, emergency medicine, intensive care medicine, endocrinology, nephrology, cardiology and ear nose and throat specialists to enhance our knowledge base and help them in return with our speciality knowledge of clinical and surgical issues of the maxillofacial region. Deputing post graduate students at various above-mentioned departments have not yielded desired results in the past. An intensive, assessable and effective method must be designed for this purpose. Including the aspects learnt during these deputations in the final assessment of the student conducted by the university may help in making the students more committed to these aspects of the speciality.
- Training in latest advances in imaging modalities has remained the most neglected aspect in our speciality. A lot of dental schools already have installed CBVI machines in their departments. But access to the Multidetector Computed Tomography, Magnetic Resonance Imaging, Ultrasonography machines under adequate guidance from a trained specialist in the respective field has remained possible in only those schools which are attached to medical schools. The concept of hosting or allocating a zonal diagnostic centre with general radiologist specifically inducted to train post-graduate students of all the dental schools belonging to the zone can be used on a trial basis. A comprehensive training program may be designed enabling the students to perform better as a specialist later in life.

Conclusion

“Change is the only constant thing in life”. As this famous saying goes, there is a constant need to assess, review and upgrade ourselves to keep changing and adapting to the suit the future times. A constant mechanism to institute and embody these objectives and all those felt necessary at definite time intervals needs to be established to maintain the uniqueness of the speciality and to attract the best students to take our profession ahead in time to come.

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