



Interdisciplinary role of oral physician in stomatognathic diseases

S. Jeelani¹, P. Duraiselvi¹, R. Amirthaa Priyadharsini²

¹Department of Oral Medicine and Radiology, Sri Venkateshwaraa Dental College, Ariyur, Puducherry, India, ²Department of Oral Pathology and Microbiology, Sri Venkateshwaraa Dental College, Ariyur, Puducherry, India

Keywords

Brain pacemakers, cancer, depression, epigenetics, phytochemicals, prolotherapy, temporomandibular disorder, Virtopsy

Correspondence

Dr. S. Jeelani, Department of Oral Medicine and Radiology, Sri Venkateshwaraa Dental College, Ariyur, Puducherry, India.
Phone: +91-9943047572.
E-mail: jeelani1978_s@rediffmail.com

Received 02 April 2017;

Accepted 09 May 2017

doi: 10.15713/ins.jcri.169

Abstract

Diagnosis is a pivotal step against any pathology. The role of oral physician in the management of stomatognathic diseases has always been a challenging step both in terms of diagnosis and therapeutics. The scope of the oral physician is diverse. This paper is just a tip of the iceberg reflecting lateral and integrated responsibilities of the specialty in the management of oral and systemic diseases such as temporomandibular disorders (TMDs), cancer, behavioral disorders, human immunodeficiency virus (HIV), and forensics. The significance of brain pacemakers in the management of refractory depression as a part of neuropsychopharmacological integration, inflammation-based therapeutic modality such as prolotherapy in the treatment of TMD, deoxyribonucleic acid (DNA) methylation as part of epigenetics in the management of cancer, virtual autopsy using imaging in forensic identification, and phytochemicals as supportive adjuvant for HIV has been dealt as part of this paper. The paper portrays the silent guiding role of an oral physician in the interdisciplinary approach with respect to stomatognathic diseases.

Introduction

The pivotal step against any pathology is diagnosis. In ancient days, it was achieved with the triad of rationale thinking, experienced knowledge, and judicious approach which today glows with multifarious technological dimensions. The emergence of oral medicine dates back to 25,000 years ago when evidence of tooth decay was noted in the skulls of Cro-Magnon people and the evidence of acupuncture by Chinese to treat pain associated with tooth decay in 2700 B.C.^[1] The broad horizons of oral medicine date back to 1839 when Brown first made an emphasis of the systemic effects on oral tissues.^[2] Henceforth, the significance of oral manifestations of systemic diseases and thereby establishing the oral systemic connection.^[3] Aiding in diagnosis, Roentgen's accidental discovery of X-rays when experimenting with cathode radiation has today crossed milestones.^[4] Beyond serving as an essential investigation in many needful circumstances, it has served to discover occasionally the silently existing pathologies during routine examination. The pioneer to bridge dentistry to systemic health was Dr. Horace Wells, a dentist who demonstrated insensitivity to pain from dental extraction on December 11, 1844 using nitrous oxide anesthesia. As a reflection of the same, this paper

deeply reflects oral medicine as a pivotal and guiding specialty focusing, especially, on research and its application.^[6,7]

Depression and Smile Implants

As part of treatment-resistant cases, many chronic pathologies including those of oral and maxillofacial region are a treatment challenge to dental professionals. Such chronic pathologies may sometimes lead to behavioral disorders such as depression. Smile is a blissful expression, and a dentist plays a significant role in this context. However, the sensational part of smile is that occurring from within which certain groups of patients suffering from depression fails even after all possible medical and surgical treatment modalities. Neurologists have speculated that in such hopeless patients there are abnormally high levels of activity in the CG25-subgenual cingulate area known as the sadness center.^[8] To overcome this and to provide a sparkling recovery is a new dimension in neuropsychopharmacology-brain pacemakers - which by the principle of deep brain stimulation - retunes and remodulates the activity of the diseased brain and corrects the diseased messages responsible for the miserable behavioral disorder and succeeds in bringing a smile

from within.^[9,10] The brain pacemakers by virtue of their role in the management of depression can be referred to as smile implants. The specialty of oral medicine may serve as a platform in identifying such group of patients and serve as a bridge to the concerned medical specialties.

Temporomandibular Disorder (TMD) and Prolotherapy

TMD is a treatment challenge to the dental professional as they are part of chronic pain pathologies. Apart from the multiple existing treatment modalities, regenerative injection therapy or proliferative injection therapy popularly referred to as prolotherapy is an interesting treatment strategy. This technique involves injecting a non-pharmacological and non-active irritant solution referred to as proliferant solution comprising dextrose, lidocaine, phenol, and glycerin/cod liver oil extract in the region of tendons or ligaments for the purpose of strengthening weakened connective and alleviating musculoskeletal pain. It differs from the currently existing therapeutic modalities in that it induces inflammation and causes the body to heal itself through the process of inflammation which causes the release of growth factor and helps in repair and regeneration. It has proven to be useful in unresolved and chronic neck pain, knee pain, low back pain, and the most challenging pain in TMD associated with temporomandibular joint (TMJ) disk displacement, TMJ arthralgia, and related orofacial pain.^[11] The role of prolotherapy in the management of TMD is a lateral approach for treatment-resistant cases of TMD.

Cancer and Epigenetics

The management of cancer using surgery, radiation, and chemotherapy has always been the prime methods of treatment modality. Among the factors associated with induction of carcinogenesis, the silent role of genetics in the etiopathogenesis has occasionally been overlooked. Contrary to conventional genetics, an important discovery in science of hereditary is epigenetics which is the study of changes in gene activity that do not envisage alterations in the genetic code but still get passed down to at least one successive generation. The fundamental concept involved is deoxyribonucleic acid (DNA) methylation and histone modification. Methyl group (an epigenetic factor) found in diet can express or repress the genes. The binding of this epigenetic factor to the histone fails alters the extent to which DNA is wrapped around the histones and the availability of genes in the DNA to be activated. In context with cancer, aberrant DNA methylation appears as global hypomethylation accompanied by region-specific hypermethylation, respectively, resulting in chromosome instability and inactivation of tumor suppressor genes. Moreover, thus, reversal of abnormalities in DNA methylation may help to restore the tumor suppressor function of the genes and provide a novel approach to cancer therapy.^[12]

Forensic Identification and Virtopsy

Identification of unknown by teeth dates back to 66 A.D. The interesting fact is that the tooth is the hardest structure withstanding temperatures even as high as 1600°C and thereby resisting potentially destruction and decomposition for considerable periods after death.^[13] The next dimension of forensic is reflected by autopsy which is upgraded by Virtopsy. Respecting deeply the human body even after death, in exploring, the cause of death is Virtopsy - a recent advance outshining conventional autopsy. It is basically a procedure employing a non-invasive scalpel-free technique preserving the body architecture and also the data being stored in digital format serving internationally for cross opinions and legal formalities. More important of all is that it holds better acceptance for the relatives of the deceased and also satisfying the religious customs of few as incisions are replaced by three-dimensional surfaces scanning with multi-slice computed tomography (CT) and magnetic resonance imaging (MRI) spectroscopy which reflects the moral shadows in forensic imaging.^[14,15]

Traditionally, the 1 h invasive autopsy procedure involves a forensic pathologist who makes a Y-shaped incision running down the chest and beneath either side of the rib cage. Then, the skull is opened, and brain is exposed and foreign objects if any are removed and stored as evidence.^[16]

In contrary to this conventional procedure, a minimally invasive procedure using a dual energy CT scanner and MRI machine as part of imaging performs the same within 10 s to ½ h. It involves maximum amount of radiation to the deceased to acquire very high-resolution details of skin, flesh, bone, and foreign objects and ultimately constructing a virtual body obtained from 6 Gb worth of information through a procedure known as Virtopsy.^[17]

The details from MRI and CT are downloaded to the high-resolution flat-screen LCD, and the sophisticated video graphics card helps in converting all the acquired information database into a virtual human body. This can be examined by up to 6 members in multiple angles by swiping a finger, removing layers of muscle, zooming organs, and slicing tissues with a virtual knife.^[18] Ultimately, the role of Virtopsy serves a moral boon to the deceased and their family.

Human Immunodeficiency Virus (HIV) and Phytochemicals

Phytochemicals are plant-derived chemicals that portray traditional medicine. Phytochemicals have a potential role in various diseases, and they serve an important role in alternate medicine. They play an adjuvant role in AIDS, wherein alpha-terthienyl is an emerging landmark in antiretroviral therapy. It is a naturally occurring secondary plant metabolite found in abundance in the roots of plant trithiophene. Its antiviral activity is related to its activation by UV light (320-400 nm), once activated it generates oxygen radical species which have the capacity to inhibit several enzymes including that in potentially

disastrous HIV.^[19] HIV which is one of the leading causes of death worldwide is no doubt tackled with advanced allopathic strategies. However, the role of alternate medicine is a supportive aid in improving the quality of life of the affected individual.

Conclusion

The interdisciplinary role of oral physician in the stomatognathic diseases has always been a pivotal platform both in terms of diagnosis and therapeutics. With advances in science, the current era of management of patients is well taken over by the field of personalized medicine which is also referred to as theranostics. Theranostics is the term used to describe the proposed process of diagnostic therapy for individual patients to test them for possible reaction to taking a new medication and to tailor a treatment for them based on the test results. Personalized medicine is the use of detailed information about a patient's genotype or level of gene expression and a patient's clinical data to select a medication, therapy, or preventive measure that is particularly suited to that patient at the time of administration. The test results are used to tailor treatment, usually with drug that targets a particular gene or protein. This method is looked as the possible end result of new advances made in pharmacogenomics, drug discovery using genetics, molecular biology, and microarray chip technology.^[20] The future of medicine in patient management is reflected by interdisciplinary and integrated team approach in wholesome and holistic patient care.

References

- Bouquot JE, Lense EC. Historical events which established oral pathology and oral medicine as integral parts of organised dentistry. *Oral Surg Oral Med Oral Pathol* 1994;78:343-50.
- Brown AM. Review of Burdell & Burdell's observation on the structure, physiology, anatomy and diseases of the teeth. *AMJ Dent Sci* 1839;1:19-24.
- Plemons JM. A vision of dentistry and medicine: A natural fit. *Tex Dent J* 2005;122:1120-1.
- Shreeve DR. William Roentgen's (1845-1923) influence: Contrasts and comparisons. *J Med Biogr* 2010;18:158-62.
- Haridas RP. Horace wells' demonstration of nitrous oxide in Boston. *Anesthesiology* 2013;119:1014-22.
- Hegarty AM, Mighell AJ. So you want to be an oral medicine physician. *Br J Hosp Med (Lond)* 2009;70:M192.
- Elangovan S. Research as a career choice for Indian dentists. *Indian J Dent Res* 2008;19:170-1.
- Hamani C, Mayberg H, Synder B, Giacobbe P, Kennedy S, Lozano AM. Deep brain stimulation of subcallosal cingulate gyrus for depression: Anatomical location of active contacts in clinical responders and a suggested guideline for targeting. *J Neurosurg* 2009;111:1209-15.
- Hamani C, Mayberg H, Stone S, Laxton A, Haber S, Lozano AM. The subcallosal cingulate gyrus in the context of major depression. *Biol Psychiatry* 2011;69:301-8.
- Springer US, Bowers D, Goodman WK, Shapira NA, Foote KD, Okun MS. Long-term habituation of the smile response with deep brain stimulation. *Neurocase* 2006;12:191-6.
- Rabago D, Beat TM, Beamsley N, Patterson J. A systemic review of prolotherapy for chronic musculoskeletal pain. *Clin J Sport Med* 2005;15:376-80.
- Diez-Pérez R, Campo-Trapero J, Cano-Sánchez J, López-Durán M, Gonzalez-Moles MA, Bascones-Ilundain J, *et al.* Methylation in oral cancer and pre-cancerous lesions (review). *Oncol Rep* 2011;25:1203-9.
- Manjunath BC, Chandrashekar BR, Mahesh M, Vatchala Rani RM. DNA profiling and forensic dentistry--a review of the recent concepts and trends. *J Forensic Leg Med* 2011;18:191-7.
- Dirnhofer R, Jackowski C, Vock P, Potter K, Thali MJ. VIRTopsy: Minimally invasive, imaging-guided virtual autopsy. *Radiographics* 2006;26:1305-33.
- Thali MJ, Yen K, Schweitzer W, Vock P, Boesch C, Ozdoba C, *et al.* Virtopsy, a new imaging horizon in forensic pathology: Virtual autopsy by postmortem multislice computed tomography (MSCT) and magnetic resonance imaging (MRI)--a feasibility study. *J Forensic Sci* 2003;48:386-403.
- Jayashree GP, Gurudatta SP. Pathological autopsy: Most valuable aid in the present medical and medicolegal scenario. *J Indian Acad Forensic Med* 2012;34:74-6.
- Roberts IS, Benamore RE, Benbow EW, Lee SH, Harris JN, Jackson A, *et al.* Post-mortem imaging as an alternative to autopsy in the diagnosis of adult deaths: A validation study. *Lancet* 2012;379:136-42.
- Soltanzadeh L, Imanzadeh M, Keshvari H. Application of robotic assisted technology and imaging devices in autopsy and virtual autopsy. *Int J Comput Sci Issues* 2014;11:104-9.
- Hudson JB, Harris L, Teeple A, Towers GH. The anti-HIV activity of the phytochemical alpha-terthienyl. *Antiviral Res* 1993;20:33-43.
- Kelkar SS, Reineke TM. Theranostics: Combining imaging and therapy. *Bioconjug Chem* 2011;22:1879-903.

How to cite this article: Jeelani S, Duraiselvi P, Priyadharsini RA. Interdisciplinary role of oral physician in stomatognathic diseases. *J Adv Clin Res Insights* 2017;4:100-102.

This work is licensed under a Creative Commons Attribution 4.0 International License. The images or other third party material in this article are included in the article's Creative Commons license, unless indicated otherwise in the credit line; if the material is not included under the Creative Commons license, users will need to obtain permission from the license holder to reproduce the material. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/> © Jeelani S, Duraiselvi P, Priyadharsini RA. 2017