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Review Article

Academic Journey in Oral Medicine and Diagnosis Case-Based Learning- Part 1

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ABSTRACT:
Dental curriculum regulated by the council and accreditation authorities in India has seen much-needed changes, including the inception of problem-based learning (PBL) among dental institutes. This article aims to look at different cases of premalignant and malignant oral lesions/conditions through the prism of PBL in teaching dental interns. This is in response to the shortcomings of conventional methods of instruction, where a student used to learn on their own without ever having seen the case in question. Compared to pupils taught using more conventional methods, research suggests that PBL-based students learn more effectively and have better professional abilities. The article presents three cases of premalignant lesions/conditions and one case of squamous cell carcinoma. The emphasis for each case is to highlight the advantage of PBL from the eyes of a dental student.
Key words: white mucosal lesions, red mucosal lesions, leukoplakia, tobacco, squamous cell carcinoma, oral cancer.

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INTRODUCTION

Most professional trainings over the last decades have seen transformation, especially more towards evidence-based and recent advances in their respective fields. Such changes have placed more emphasis on problem-based learning (PBL) in both medical and dental academic fields. PBL uses digital learning tools, learning objects, interactive armamentarium, and learning management systems to make medical and dentistry education student-friendly. India's medical education regulator, the Medical Council of India (MCI), includes PBL in its curriculum.[1] This has also prompted the Dentistry Council of India (DCI) to implement PBL for dentistry education.[2] Such emphasis has also seen the implementation of a 'research teaching nexus' in dental curriculum, which integrates the doctrines of research into each basic dental subject while a student is an undergraduate.[3] It provides an undergraduate student with an early exposure to the rigors of higher education. The widely accepted model describes the research-teaching nexus as research-led (teaching subject content), research-based (inquiry-based learning), research-tutored (learning and discussing research findings and scientific literature), and research-oriented.[4] The Indian government's new National Education Policy (NEP) prioritises creating a conducive atmosphere for research and innovation in India's universities in order to increase both the number and quality of research conducted in the country.[5] Thus, the National Education Policy of 2020 aims to inculcate scientific method, holistic development, and critical thinking skills in order to improve research outputs and facilitate high-quality research. In many developed countries, many universities have a compulsory research project conducted by undergraduate students during their internship, while at the same time they are also

required to publish the findings of their research in a widely accepted research journal. Undergraduate dental students, particularly those enrolled in prosthodontics and restorative dentistry, find it challenging to grasp associated concepts like the science of dental materials (SDM), which is a core subject in the curriculum, but can be understood better through conducting research.[6] Students have generally been positive towards patient (case)-based learning systems as a teaching technique, due to the fact that it has been shown to increase students' interest in and enthusiasm for learning.[7] In the era of information overload, integrating research in all fields, particularly medicine and dentistry, is crucial. Universities focus on teaching, clinical practice, and research, as evidence suggests this can significantly impact these three outcomes.[8] However, medical and dental students during their professional training have found it difficult to grasp theoretical concepts due to a lack of observing the cases in regular clinical sessions.[9] Students have even found clinical subjects quite different, despite having undergone a preclinical training in the same subject.[10]

Certain subjects, however, cannot be learnt without having sound theoretical knowledge of the topic, general medicine and oral medicine being two of them. The subjects are vast, and many clinical features are common to a wide array of diseases, which makes it much more complex and difficult. Oral medicine practice encompasses conditions affecting oral soft and hard tissues that includes mucosa, various salivary glands, nervous regulation of all oral structures and musculoskeletal complex not directly linked to dental pathology.[11] The histopathological features of many clinically different-looking conditions are basically looking similar; therefore, case-based learning to identify the differences between two different conditions becomes more important. This case series is an attempt to present the authors experiences of case-based learning during their regular posting as intern students at a private dental school in Northern India. The authors have attempted to show a brief overview of each case with their learning experiences.

Case series and discussion

Premalignant and Malignant Oral Lesions

Tobacco Pouch Keratosis: Figure 1 (A and B) shows a case of tobacco pouch keratosis or smokeless tobacco keratosis. The clinical features of this lesion included a grey/white area with corrugated plaque, a roughened surface, and an asymptomatic appearance. The formation of a white mucosal lesion in the region of tobacco contact is a significant clinical feature that leads to its provisional diagnosis. The lesion appears when tobacco is regularly chewed or snuff-dipped in a particular region of the oral cavity. Since the lesion is precancerous, dentists need to inform the patient about the negative consequences of tobacco use and encourage them to give it up. Smokeless tobacco contains chemical carcinogens such as nicotine, tobacco-specific N-nitrosamines, and the polynuclear hydrocarbon benzo[a]pyrene, which are associated with malignancies of the mouth, stomach, and oesophagus. These substances may cause dysplastic alterations in the oral mucosa when smokeless tobacco is administered intraorally.[12] Smokeless tobacco keratosis, leukoplakia, erythroplakia, verrucous carcinoma, and squamous cell carcinoma are among the pathologic lesions linked to these products.[13] Smokeless tobacco keratosis may have hyperkeratotic and/or acanthotic squamous epithelium and be nonspecific. Increased sub-epithelial vascularity and intracellular oedema may occur. Parakeratin chevrons in superficial epithelial layers are usually seen.[14] Therefore, a histological examination of these lesions is necessary to detect epithelial dysplasia. Clinical exams and patient interviews can identify smokeless tobacco keratosis. If corrugated buccal mucosa is found, ask about smokeless tobacco usage. The doctor should also check if the patient's tobacco placement matches the lesion. Smokeless tobacco keratosis usually resolves after quitting. Patients may be advised to switch tobacco placement and then evaluated two weeks later. Early to moderately formed lesions should self-resolve, whereas more advanced lesions may be cancerous or require a longer time. The doctor should advise the patient to quit smoking since switching sides might cause dysplastic alterations in other oral areas.

Figure 1: (A) Intra oral picture of buccal mucosa on left side of the mouth showing the tobacco pouch keratosis associated with placement of smokeless tobacco placement (B) intra oral view of same lesion with cheeks retracted.

Erosive lichen planus: Figure 2A presents a case of a male patient whose clinical features included an erosive patch surrounded by white striae, present bilaterally, on the buccal mucosa. The lesion was diffuse and spread over the entire buccal mucosa. The oral mucosa (epithelium, lamina propria) are affected by oral lichen planus, a chronic inflammatory disorder that is not contagious.[15] Skin lesions may also be present. Oral lichen planus (OLP) is related to autoimmune disorders that reflect the effects on the mucous membranes.[16] It can manifest in a variety of clinical presentations. Plaque, erosive, bulbous, atrophic and reticular are the most often reported types in the literature.[15] The aggressive nature of the erosive kind makes it a premalignant condition, and it is the second most prevalent variety.[16.] It has also been reported under periods of stress.[17] The histological evaluation of the incisional biopsy confirmed the clinical preliminary diagnosis. Antioxidants, as well as local/systemic steroids, were prescribed to the patient. The patient reported a significant improvement in his burning feeling after ten days. We emphasised the need for dental hygiene education, urged the patient to stop smoking, and suggested that he have frequent checkups to track the progression of his condition. Oral lichen planus has a 1 in 10 chance of progressing to squamous cell carcinoma, with the erosive subtype being particularly common.[18] According to Eisen, some of the Koebnerogenic variables that might worsen OLP include smoking cigarettes, mechanical trauma from dental operations, mucosal damage from sharp cusps, and oral habits such as lip biting.[19] The most advanced form of OLP is erosive OLP, which causes mucosal erosions as well as ulcerations (atrophic and/or erythematous), as well as radiating white striae. Pseudomembrane may occasionally encase the ulcers that accompany it. In most cases, its distribution is multifocal. The lesions can cause significant pain, potentially negatively affecting the patient's quality of life, underscoring their clinical importance. The differential diagnosis is broad and includes other non-malignant, premalignant, and malignant conditions [candida infections, leukoplakia, pemphigus, erythema multiforme, lichen sclerosus, syphilis, etc]. Lichenoid medication responses are a key component of the differential diagnosis of OLP because they can look and feel very similar to cutaneous LP.[20]

Speckled Leukoplakia: Figure 2B presents a case of an adult male patient aged 46 years, with a clinical picture of a white lesion with white specks and a history of burning sensation of the oral cavity. The lesion was present on the buccal mucosa, extending from the angle to the mouth on the right side, with a range of 1.5 centimetres in height to 3.5 centimetres in length. The patient was a chronic smoker and had a history of alcohol use. The lesion was surrounded by white patches with the central part being red in color. The diagnosis was confirmed by histopathological evaluation, which revealed various degrees of dysplasia in the reddish areas of the lesion. The observation also revealed features of acanthosis and hyperkeratosis. Leukoplakia is characterized by the presence of a non-removable white plaque or patch. However, even after ruling out risk variables that do not indicate cancer, its origin remains uncertain. The World Health Organisation defines speckled leukoplakia (SL) as a kind of leukoplakia characterised by plaque lesions that are both white and red in colour.[21] Rare and extremely aggressive, SL is a kind of leukoplakia that can develop into cancer and is thought of as a precursor lesion for squamous cell carcinoma.[22] In nonhomogeneous leukoplakia, epithelial dysplasia is less prevalent than in homogeneous leukoplakia.[23] The patient's excisional biopsy revealed hyperkeratosis of epithelium with moderate dysplasia.

Squamous cell carcinomainvolving floor of the mouth: Figure 2C shows a case of a squamous cell carcinoma in relation to the floor of the mouth in the anterior region involving the lingual frenum and lingual mucosa. The case was of an elderly male patient who reported with a history of a non-healing ulcer in the mouth. The patient was a chronic smoker and tobacco chewer and used to drink local alcohol at times. The patient was finally diagnosed with a squamous cell carcinoma, which is considered to be a very aggressive and fatal neoplasm of the oral cavity if found in this region. The lesion can spread locally very rapidly, which makes its control through treatment very difficult. Regional spread to lymphatics makes things worse for recovery. Despite decreasing tobacco use, oral cavity cancer 5-year overall survival rates remain poor, with 263,000 new cases diagnosed in 2008, with squamous cell carcinoma being the most common.[24-26] The tongue is the primary site of presentation for most oral cancers, accounting for 35.1%, while the floor of the mouth is the second most common site.[27,28] Nodal metastases or bone invasion are indicators of advanced illness in cancers of the floor of the mouth. Studies show that radiation therapy and surgical treatment considerably improved overall survival in patients with advanced-stage cancers. Differential diagnoses include multiple precancerous and cancerous lesions like leukoplakia, erythroplakia, verrucous carcinoma, keratoacanthoma, and basal cell carcinoma.[29-32] Depending upon the extent of the lesion, the surgical treatment may include subtotal maxillectomy (for the maxillary arch) or mandibulectomy/hemimandibulectomy and neck dissection when enlarged and involved lymph nodes are seen.[33-38] most patients treated surgically require some form of prosthodontic rehabilitation to improve their quality of life, and all patients require a strict follow up protocol for identification of recurrences.

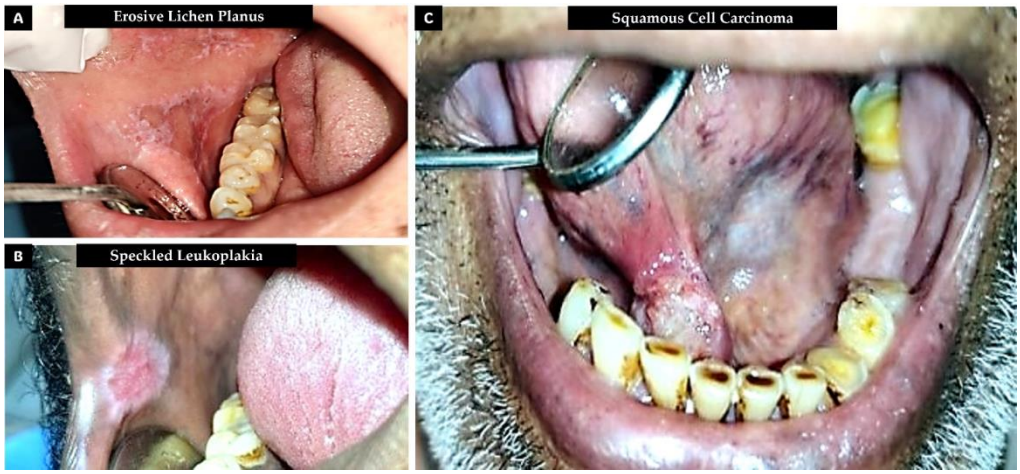

Figure 2: (A) Intra oral photograph showing the extent of lichen planus on the right sided buccal mucosa (B) Intra oral view of the buccal mucosa in the region of angle of mouth showing the clinical picture of a speckled leukoplakia, with a central zone looking pale red while being surrounded by white circular area (C) Intra oral view of a patient with a non healing ulcer in the floor of the mouth near the lingual frenum which was later diagostic of squamous cell carcinoma in histopathological evaluation.

DISCUSSION

PBL (Problem/Case based Learning) is a teaching approach that emphasises student-centred learning among small student groups and is principally based on teacher-to-student metacognitive communication. Tutors play a crucial role in guiding students through metacognitive communication, enhancing their understanding and problem-solving skills. Various formats present problems in health and medical education, challenging students to integrate knowledge from various disciplines. Problems also serve as a vehicle for developing problem-solving skills, allowing students to raise doubts or questions, accomplish physical patient examinations, and also at times understand the contents of a request for the necessary laboratory tests.[39] Students learn best when they work in groups and are responsible for their own education; this is achieved through activities such as collaborative review, discussion, comparison, and debate.[40] This approach encourages students to develop problem-solving skills and integrate knowledge from various disciplines. A similar effect was observed in the compulsory exercises mandated for the authors during their intern training. Although it was difficult at times to comprehend the understanding of the scale of information that was collected in one day, it allowed them to reflect upon what they learnt on a particular day. Students are said to be highly motivated by problem-based learning (PBL) because they work on real-life problems in small groups with intermittent supervision, solving them in an independent capacity.[41]This drive is affected by external factors like the issue at hand or the facilitator's talk. The impact of problem-based learning (PBL) on students' intrinsic interest in learning has been the subject of few empirical research.[42] Schmidt and Moust's path model found a strong correlation between PBL features, group functioning, and intrinsic interest in the topic.[41] The role of tutors in Problem-Based Learning (PBL) is a argumentative issue, with some scholars arguing for expert expertise and others focusing on facilitation. The trainees had constant access to experts and educators in the current department of oral medicine and diagnosis, where they observed and followed these cases. At times, postgraduate students would also chip in with their expertise, which was later confirmed by the academic staff. All of the cases presented in this article received consultations from a different array of expertise, which included professors, assistant professors, and post graduates.

Studies also show that student tutors perform better on exams and have a better understanding of problems when such teaching approaches have been measured.[43] Tutors also show special interest in their students and become role models for critical thinking and reflection. The transition from information presenters to problem-solving session facilitators, supervising discussions and asking questions, ensures accuracy and relevance.[44] The tutor's conceptualisation of student engagement and knowledge growth is crucial to the successful implementation of problem-based learning (PBL). Students achieved the learning objectives by making a presentation of their cases, with each case highlighting features being questioned during presentations. This ensures that a student who has observed and followed up on the case has understood the concept of a disease or a condition. With so many lesions on the oral mucosa having similar appearances, the exposure to an actual case makes the differences in clinical appearances more comprehensible to a learner. However, it is mandatory that a learner must have the knowledge of that condition and study the condition after observing a case so that clarity of less comprehensible characteristics is achieved.[44]

CONCLUSION

PBL in the oral medicine and diagnosis subject enhances students' critical thinking, teamwork, and lifelong learning skills. It prepares them for future careers by teaching them to analyse and solve real problems, thereby improving the effectiveness of teaching in dental education institutes. All observed cases were discussed by trainees among themselves during leisure hours, which allowed other trainees to be exposed to cases that they had not observed.

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