

## Short Communication

# Puzzle Based Learning in Dental Education - A New Avenue

Shishir Ram Shetty<sup>1\*</sup>, Sura Ali Ahmed Foud Al-Bayati<sup>2</sup>, Ridhima Suneja<sup>3</sup> and Shishir Ram Shetty<sup>4</sup>

<sup>1\*</sup>Department of Oral medicine and radiology, College of dentistry, Gulf medical University, Ajman, United Arab Emirates

<sup>2</sup>Department of Oral medicine, College of dentistry, Gulf medical University, Ajman, United Arab Emirates

<sup>3</sup>Department of Conservative Dentistry and Endodontics, College of dentistry, Gulf medical University, Ajman, United Arab Emirates

<sup>4</sup>Department of Oral medicine and radiology, College of dentistry, Gulf medical University, Ajman, United Arab Emirates

**\*Corresponding author:** Shishir Ram Shetty, Assistant Professor, Department of Oral medicine and radiology, College of dentistry, Gulf medical University, Ajman, United Arab Emirates, Tel: +971-556491740; E-mail: rshishirshettyomr@yahoo.com

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## Introduction

In today scenario a teaching faculty in dentistry has numerous roles which include, administrative responsibilities, planning clinical and lesson schedules at the same time innovate, adapt and implement teaching/assessment methods [1,2]. To adapt this newer teaching learning methods a number of strategies have been suggested in dental education [3,4].

A recent survey revealed that 86percent of dental schools in North America characterized their curriculum as traditional discipline, lecture-based [5]. In this traditional method students are first explained the underlying mechanisms of disease in the basic level. This is followed by disease categorization and demonstration of these mechanisms in patients in later stages [6]. As an alternative problem based learning (PBL) emphasizes on clinical problem solving to make students understand the basic and clinical concepts of disease [7]. One innovative technique to improve student's problem-solving skills is puzzle-based learning approach which aims at encouraging students to think about how to frame and solve unstructured problems which are not described in routine text books [8].

## History

The puzzle-based learning approach has been used in education system for over 60 years. Mathematical puzzles were encountered in Sumerian texts that belong to 2,500 BC. One of the best examples of puzzle-based learning approach was found in the works of an English scholar by the name Alcuin born around AD 732. His work comprised of over 50 puzzles in the form of a text titled "Problems to Sharpen the Young". His work is still being used by numerous artificial intelligence textbooks [9].

## Abstract

Dentistry is a profession that is involved in the prevention, diagnosis and treatment of diseases, disorders and conditions of the oral cavity. It involves a combination of art and science and communication skills. In the recent years emphasis has been laid on developing a system of dental education that would generate more efficient professional to face the future challenges. The system of dental education is now shifted towards Problem-Based Learning. One of the innovative methods in recent years is puzzle based learning which has been applied in fields like mathematics, engineering and medicine but has not been attempted in dentistry. In this brief review we discuss the possibility of application of this innovative method in dentistry.

**Keywords:** Dental education; Puzzle based learning; Medical education

## Puzzle based learning in basic and applied sciences

Although puzzle based teaching model has existed for many years only recently, problem based, project-based and puzzle-based learning courses have been introduced as a teaching method for engineering courses and degree courses in basic and applied sciences. In addition to specific course content the puzzle based model aims to teach engineering students critical thinking and indulge in problem-solving techniques [10].

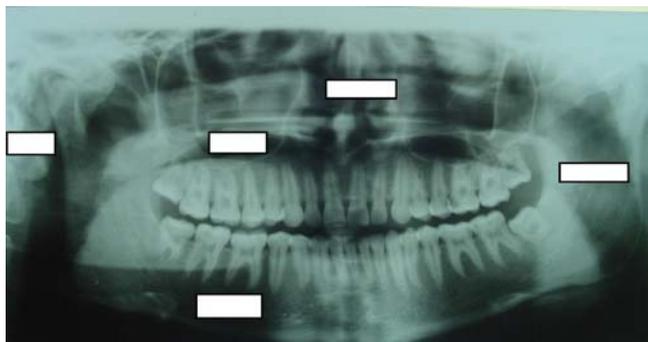
## Puzzle based learning in medicine

In conventional medical education to teach the students are first taught underlying mechanisms of disease through basic science learning. An alternate newer approach is, problem based learning (PBL) where in the basic and clinical concepts of disease are taught through solving a clinical problem [11]. A recent study has demonstrated that puzzle based learning is a novel teaching technique for concepts like reading electrocardiogram to medical students as it is more interactive and learner centered [12]. The researchers also stated that students may learn more efficiently in relaxed environments that are more learner-centered [12].

## Scope for puzzle based learning in dentistry

Many recent publications have identified obstacles to and strategies for change in dental education [13,14]. Recently an two major teaching models are being introduced into dental education: case-based learning (CBL) and problem-based learning (PBL) [15].

We are currently working on puzzle based learning in dental education in instances like teaching students the normal radiographic landmarks on an orthopantomograph. Example 1- An image can be displayed and all the options can also be provided. A group of



**Figure 1:** Match the landmarks on the radiograph with the options given below  
Maxillary Sinus, Nasal Septum, Ramus, Body of Mandible, CervicaVertebrae.

students could be engaged to discuss and suggest the landmarks on the radiograph (Figure 1).

It can also be used to teach a group of students to formulate a treatment plan for a particular condition.

Diagram of Example 2 here below - Arrange the treatment options given below in chronological order to make a treatment plan for oral leukoplakia.

- First appointment.....
- Second appointment.....
- Third appointment.....
- Further appointments.....

**Options**

- Periodic review Antioxidant therapy
- Habit counseling Biopsy

Once we complete the study, we would be looking forward to publishing the results regarding puzzle based learning in dentistry. One of the major advantages of puzzle-based learning is an effective increase in the number of students in contrast to the conventional teaching method wherein a teacher keeps moving students forward ultimately making it arduous for the teacher and unrewarding for the students [16].

On the other hand, a specific problem encountered in puzzle-based learning is that some students may feel that how solving puzzles is going to be of help to them in future studies. Students may undertake dull and repetitive activities, such as memorizing mathematical tables or complicated formulas, because it will “be on the test,” but at the same time may not be interested in puzzle based learning course as it may not be asked during their exams [16].

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