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ORIGINAL ARTICLE

Enhanced learning through Natural Model training: Case for application in pediatric dentistry

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ABSTRACT

Background: In field of pediatric dentistry, proper diagnosis and teaching is very important in analysis of resorbed root radio graphically in deciduous teeth for pulpectomy.
Aim: To present a new method that improves root canals quality by Undergraduate who was learners.
Methods: The oral medicine department selects study cases from OPD. The deciduous teeth were extracted and molded in the transparent epoxy resin similar as their position in human jawbone. Then, their own pre-extraction radiographs were pasted along with them. There was selection of about forty dental Undergraduate in conventional group and experimental Group A. Data from all the participants was carefully analyzed. There was allocation of a questionnaire to each participating Undergraduate that consisted of answer choice in Lickert scale in order to measure aptitude of Undergraduate to this new method and then data obtained was an analyzed statistically.
Results: when the mean degree of learning aptitude was compared between experimental Group A group and conventional group then experimental Group A group showed significant results 8.9 than conventional group 6.1, whereas p= 0.03 <0.05.
Conclusion: By using the natural models in radiography training, we can make undergraduate to learn better educational diagnosis pediatric dentistry as well as make them compatible to face upcoming challenges in periodic field of dentistry.
Keywords: Pediatric Dentistry; Radiology; Pulpectomy; Medial Education, Undergraduate

INTRODUCTION

Now a day, modification is made in dental education system for better understanding. Modern dentistry involves new training tact like virtual reality systems and stimulation in order to make it easy for Undergraduate to understand [4]. Voxel-based models are used for hand skills training that present the actual virtual tooth model [8]. It is necessary for graduates & dental graduates to have complete knowledge about radiographic diagnosis and its interpretation. In order to detect disorders or disease radio graphically it is important that undergraduate should have complete knowledge about tooth anatomy and its structures. So, it is necessary to impart dental Undergraduate knowledge with spatial-mental models so that they can practice to improve their daily practice from radiographic diagnostic aspect. Radiographic examination of images was carried out along its extraction of a three-dimensional perception from two-dimensional representations of the anatomy[7]. The relative position of objects determination on radiographs can be described as an ability to mentally integration of 2D spatial information and transform it into 3D spatial information. Radiographic detection of anomaly in deciduous teeth is a great challenge in pediatric dentistry due to the over lapping of roots in deciduous teeth with buds of permanent teeth, complexity in their anatomy, as well as detection of apex of resorbed roots. For the Undergraduate who were failed to diagnosis by regular educational methods, Simulator-supported radiology training was a great source of them to practice and gain knowledge about dental radiography. In this aspect by making 3D models on the basis of cone beam computed tomography (CBCT) we can improve methods of teaching, planning and demonstration among undergraduates for better understanding. It is possible to produce these models in large models but main hindrance in application of this concept in developing countries is the cost in building large number of model production as well as computer numerical control (CNC) technology0[6]. So, it is therefore need of time to find other methods that are more economical and aid Undergraduate in better understanding. Therefore, alternative, more economical methods are required to aid Undergraduate in understanding better anatomical relations in radiology. This model should produce replica of patient's mouth anatomy and also make spatial visualization of deciduous teeth along with focusing on deciduous resorbed root anatomy.

The main objective of this case study is to make analysis and compare natural model-based training vs. with that of the conventional training method impact in pediatric dental radiology in the department of pediatric dentistry.

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MATERIALS AND METHODS

After approval from institutional Ethical Committee, the use in pediatric dentistry, about 30 extracted deciduous molars having intact roots were selected as "natural model". Teeth were extracted from age group of kids between 3 and 9 years of age. Teeth having good periapical view radio graphically (PA) were selected and disinfected with the help of 1% choloramin solution for duration of about a week. After disinfection, teeth were mounted in transparent epoxy resin. Similar to their location in jaw bone. Each tooth was positioned to its pre-extraction radiograph and

then stored so that it could presents replica of original tooth as "natural model" that was afterwards used in training in the field of pediatric dentistry. Undergraduate belonging to dental program became the part of this research that included voluntarily 16 male Undergraduate and about 24 female Undergraduate . The case study was divided into three parts first participants were randomly allocated second radiographic landmarks education given to experimental Group A and Control B groups with an allocated method third testing of participants after completing a questionnaire and training. The participants were given groups i.e. Control group B and experimental Group A via. a computerized randomization procedure depending upon their last pediatric dentistry exam results before the beginning of training. Training program that was natural model-based was assigned experimental Group A group. The method in experimental Group A group consist of anatomical landmarks explanation radio graphically by mounting teeth in transparent resin. Moreover, Different types of root resorption especially in furcation and apical sits that makes pulpectomy an uphill task due to alteration of apical foramen and altered working length were also discussed. The training given to Control group B was conventional in which explanations of the anatomical landmarks was made on the selected radiographs. Duration of training for both groups was 30 minutes. After the end of training, p proficiency testing was conducted immediately .Assessment of all participants was done on the basis of their radiographic interpretation and understanding. In assessment 25 multiple-choice questions (MCQ) were given to each participant that were based on 15 periodical radiographs of upper deciduous teeth of age 3 to 9 years old. The MCQ test was given to each Individual in form of hard copy format, whereas the PAs with each question were given in PowerPoint and demonstrated on a screen. The time given to each Undergraduate for test was 50 minutes. Out of 4 choices, every Undergraduate is supposed to select one correct answer and each Undergraduate had to select one correct answer on the hard copy sheet. The test was conducted based on "must-learn" objects in diagnosis and judged by members of the pediatric dentistry. The MCQ tests were checked by members in a blinded manner, and then there was calculation of score for each group member was carried out. After intervention phase, alternative training session was given to each participant (the method used for the other group) and again a questionnaire in hard copy was allotted with four questions to each. Then again the assessment of undergraduate was made. The House Officer's impressions were then assessed (in a qualitative term) regarding the effect of the "natural model-training tool" on their learning of pediatric radiographic anatomy. The questionnaire was designed on a four-point namely, strongly agree, agree, disagree and strongly disagree to know the fact whether the new method worked or not. Final analysis of results was done by descriptive statistics.

RESULTS

Demography of the trial groups are presented in Table 1.It was concluded that the with draw rate came out to be 8.69% in case of Control group B (three of seventeen) and for experimental Group A group, it came out to be 11.76% (two of twenty three). When the final months of house job were near, there was withdrawal of five of the candidates. The mean score obtained from learning of this study was 8.9in case of experimental Group A group and for Control group B group that came out to be 6.1 ($P=0.03<0.05$).The results of the questionnaire were seen and observed. It was clear that Undergraduate showed great interest in learning new method and technologies (91%) and was suitable for pediatric radiology leaning (93%). Moreover, the time also seemed to be saved as well (95%) (Table 2).

Table 1. Demography of Groups

Group	Male	Female	With draw	Total
Group A	9	14	2	23
Group B	7	10	3	17
Total	16	24	5	40

Table 2: Description of the Results of the Questionnaire

Questions	Strongly agree	Agree	Disagree	Strongly disagree
Enhance the learning	85%	6%	8%	1%
Better for learning pediatric radiology	92%	5%	2%	1%
Too much difficult and time taking	3%	2%	12%	83%

DISCUSSION

It was observed that candidates in the mean natural model-training group had higher degree of learning as compared to one in the conventional method (Control) group. The introduction of Natural models in field of radiography have increased interpretation and learning in pulpectomy training in pediatric dentistry. The reason behind high degree of learning among undergraduate was due to enhanced interest of undergraduate as well as their interaction and discussion sessions regarding radiographs. It has been proved that acquired skills seemed to be long-lasting as long as there is involvement of medical simulators in hands-on practice or when accomplished on feedback and repeated practice basis[9-14]. Leaning methods seemed to play important role in House Officer's learning and acquiring knowledge as well as positive outcome. So this 'deep' approach method is more effective and beneficial as compared to the 'surface' approach which involves memorizing the text just[11].

This all recorded with respect to data obtained via questionnaire. Other researches by different authors also showed similarity in accordance with this result. Now days, with revolution in the era, new methods are more applicable and demanding in medical field from educational point of view and regarded as successful as compared to old traditional learning one[5,12]. In case of pulpectomy treatment one should have up to date and proper knowledge regarding anatomy of deciduous teeth and most importantly root resorption that includes spatial concepts, like such as anatomical structure shapes, location of each partition with respect to another, and the ways they are

connected. Work in case of learning sciences has explained visualization as external help with the potential for increasing cognition[19].

The idea involved behind this deep learning is radio graphically 3D imagination logically and better interpretation of radiologic anatomy as well as landmarks in resorbed roots. Another advantage of this method is that it helps to rotate tooth is in any desired direction, that further enhance and make better 3D visualization[14]. It is very important for undergraduate to have radiographic interpretation skill in general dental practice. In case of medical Undergraduate they lack the knowledge of Radiographic interpretation accuracy. Many studies have showed that radio graphic interpretation is not related to medical education level so more focus should be paid on quality, rather than quantity in field of radiology teaching as well as in learning skills[15]. Stimulators these days are currently in practice in medical field for practice to handle emergencies in cardiovascular department, laparoscopic surgery, operating room and emergency departments.

Use of stimulator in field of dentistry is still under discussion subject specially at preclinical training areas[9]. Traditionally, use of data obtained by patients is another alternative method[2]. Simulators in field of education require more investment and that's make its application difficult especially in developing countries. It is therefore need of time to spend money in easy simple and technology-free objects to ease Undergraduate to understand upcoming study challenges easily.

In this current study only few Undergraduate took participation so if this study was carried out on large scale with large undergraduate participation, it would provide better results. In current study learning style was not mentioned. It may be possible that certain undergraduate may perform well as compared to others in the same study.

CONCLUSION

Despite the limitations of this study, it can be concluded that using natural models in radiography training seems to improve the diagnostic competency as well as the satisfaction of undergraduate in pediatric dentistry.

Conflict of interest: Nil

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