USE OF ANATOMICAL MODELS FOR LEARNING LOCAL ANAESTHETIC TECHNIQUES IN DENTISTRY- A QUESTIONNAIRE STUDY
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Abstract:

Aim: to evaluate the use of anatomical models for administration of anaesthesia techniques compared traditional lecture among dental students.

Materials and Methods: Group A comprising of twenty five students were made to listen to videos on administration of local anaesthesia and group B consisting of another twenty five students received only lectures on administration of local anaesthesia. Both the groups were assessed by a questionnaire at the end of the section. Statistical analysis was done by using cronbach’s alpha, which assessss the reliability between two groups.

Results: Group A students were more confident in locating the anaesthetic sites than Group B students. Pass rate and mean value of Group A students was high when compared with Group B. Moreover there was significant variation in anxiety levels between the two groups.

Conclusion: This method helps the students to recognise the importance anatomy for learning anaesthetic techniques and also increased patient's safety during first injection.

Keywords: local anaesthesia, anatomic models, anxiety.

Introduction:
Successful local anesthesia is the bed rock of pain control in dentistry1. The administration of local anesthesia, sedation, and general anesthesia are integral part of dental practice. Local anaesthetic are the agents that bock nerve conduction in a specific, temporary and reversible manner without affecting patient's consciousness2. Local anaesthesia is frequently used in dentistry to facilitate painless treatment. Painless treatment also improves doctor patient relationship. Moreover it enables the dentist to work with calm and precision. Understanding the anatomical
structure of maxilla and mandible and the ability to deliver local anaesthesia at appropriate site is a critical aspect of dental curriculum. Administration of first anaesthetic injection on patients remains difficult for most of the dental students when they first enter into their clinical practice. Insufficient preparation also tend to increase student’s anxiety level. Most of the dental students consider preclinical training procedure, useful preparation before their first injection on a patient. This feeling may still be present after graduation as a dentist. Most of the dentist find it difficult in anesthetizing inferior alveolar nerve for performing restorations and surgical procedures in the mandible. This is due to incorrect location of nerve in the mandibular region. Mandibular nerve block presents a lower success rate when compared to anaesthesia in the maxillary structures because of the greater density of the mandibular alveolar bone, limited access to the inferior alveolar nerve, marked anatomical variations, in addition to the need for deeper needle penetration into the soft tissue. Didactic teaching courses may decrease the anxiety of dental students in relation to the administration of a local anaesthetic injection. Patients also reported a decrease in the level of pain between insertion of the needle and the feeling of a tingling. Thus preclinical training may have small but positive effects on the administration of local anesthetics by dental students and may help to prepare them for the demands of general practice.

**Materials and Methods:**

3D models of skull with neuroanatomy of trigeminal nerve was reproduced. Maxillary nerve was traced from its origin in the foramen rotundum in the cranial cavity. Inferior alveolar nerve and mental nerve were also traced using yellow nylon thread. We then prepared three videos explaining about maxillary infiltration, mandibular nerve block and mandibular infiltration along with the anatomic course of the nerve, needle direction and operated direction for administration of anaesthesia. Students were divided into Group A and Group B, both the groups comprising of fifty student each. Group A listened to demonstration videos. Group B students were delivered only traditional lecture in power point format. At the end of the class both the groups were evaluated by a questionnaire.

**Statistical Analysis:** Cronbach’s alpha was used to test the reliability between the two groups.
Results:

Graph 1: explaining pass rate and mean rank between two groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pass rate</th>
<th>Mean rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>GroupA</td>
<td>87%</td>
<td>12.1</td>
</tr>
<tr>
<td>GroupB</td>
<td>60%</td>
<td>8.9</td>
</tr>
</tbody>
</table>

Cronbach's alpha = 0.72 which indicates that, there is good reliability between groups.

Graph 1: shows that pass rate and mean rank of group A was higher when compared with group B students. Also there was significant reliability between the two groups (alpha=0.72).

Discussion:

Dhanraj et al found that in dental practice, patients can experience pain due to pulpal pathology, periodontal pathogenic infections, malignancies, trauma and caries. The management of all the conditions invariably utilizes definitive forms of anaesthesia for treatment. Henie et al found that use of a preclinical training model did not affect the self-reported confidence level of dental students about their injection in patients. However, the recipients of the injections rated that students who had exercised on the training model more confident and calm. The major limitation of the preclinical training model is the poor representation of the oral mucosa in the area of the ascending ramus of the mandible. The pterygomandibularplica, which runs from the palate to the retromolar pad, is missing. This is an important landmark for the correct insertion of the needle in mandibular block anesthesia. To avoid anatomical limitations, preclinical use of human cadavers has been suggested as a teaching aid for local anesthesia injection technique. The anatomical models described in this article facilitate teaching in many ways. With the use of these models it was possible to conduct a comprehensive review of anatomy, especially the neuroanatomy of the cranial nerves. We could show in detail the course and anatomical relations of the trigeminal nerve with other structures. Canelleset al noted that the students perceived the importance of anatomy during the execution of anaesthetic techniques in the dental clinic. This method of teaching showed good results regarding the safety of students during
Brown et al. students who learned in the simulation laboratory through an active approach scored significantly higher in the theoretical knowledge component than students who were taught through the conventional lecture format. Another explanation for this finding could be based on situated learning theory that suggests that there should be a balance between the explicit teaching of a subject and the activities in which the knowledge learnt is used in an authentic context.

Swanwick et al suggested that Conventional lecture could swamp the memory with too much information delivered too fast or exceed reasonable concentration limits. Overload of information will lead to a lack of capacity for retention. The capacity of the memory relies on a fully engaged concentration generated by motivation for the learning task in hand.

Buchanan et al suggested that students in traditional lecture had lower scores in the theoretical knowledge component as these students were overloaded by information that exceeded their concentration limits, while students in simulation laboratory had more memory capacity because they were motivated by applying their knowledge during practice in the simulation laboratory.

Conclusion:
These anatomical models enhances the acquisition of theoretical knowledge of students. These models also helps students in their clinical practice and to provide better patient care.

Reference:
1. James D Raj, Sindhu Ramesh Evaluation of the anesthetic efficacy of inferior alveolar nerve blocks in dental patients, Saveetha Dental College, Saveetha University, India.


