

Original Article

THE MAGIC OF LEARNING BY DOING IN ANATOMY

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ABSTRACT

Introduction: There are various teaching and learning methods like lectures, demonstration, practicals etc. employed for teaching MBBS students. As the famous quote by Benjamin Franklin goes- "Tell me and I forget. Teach me and I remember. Involve me and I learn" we wanted to determine the effectiveness of students' involvement in Teaching Learning Method (TLM).

Materials and Methods: Two cohorts of 1st year MBBS students, 2020-21 Batch and 2022-23 Batch were taught the same topic by the same teacher but by different methods. The Batch of 2020-21 were taught the topic of General Anatomy of Nervous System by lecture alone while batch 2022-23 were taught the same topic by the same teacher with the help of lecture as well as activity based small group learning. The question framed on the topic was asked in the Part Completion Test of both the Batches. The answers were then marked by three different evaluators based on clarity in the understanding of the topic and the diagram drawn by the students of both the batches. The p-values of the marks obtained were compared for both the batches based on the marks allotted by all the three evaluators.

Results: The p-value obtained by independent T Test was significant in case of all the three evaluators thus proving that activity-based teaching in Anatomy when added to lecture-based teaching has a greater understanding among students as compared to lecture-based teaching alone.

Conclusions: As the new curriculum lays emphasis on student centric approach and application-based teaching for achieving a higher level of learning based on the Millers pyramid, the activity based TLM could be of great help in attaining the desired result.

Keywords: Small group teaching, Student activity, Student involvement

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INTRODUCTION

Various methods of teaching learning methods are employed for teaching the students of MBBS 1st Year in the subject of Anatomy. These methods include lectures, small group teaching, tutorials, demonstrations and dissection. Adult learning requires a different approach as it is detailed, application based and requires reasoning and logical thinking in contrast to the childhood learning which is more rote based.

The subject of Anatomy is not only vast but also volatile with an array of newer terminologies which might be difficult for the new learners of Anatomy. The concepts of Anatomy also require immense power of imagination which might not be evident or evident in the dissection or in the histological study. Such concepts may be a problem area for students.

This study was conducted to determine if employing an activity-based method of teaching and learning along with lecture was more helpful in improving the concepts and understanding among students as compared to the lecture-based teaching alone.

As the famous quote by Benjamin Franklin goes- "Tell me and I forget. Teach me and I remember. Involve me and I learn" we wanted to determine the impact and effectiveness of Activity based Teaching and Learning method in the learning outcomes of students.

MATERIALS AND METHODS

The present study was conducted in the department of Anatomy of HIMS, Safedabad, Barabanki. The study was a Retrospective Cohort Study which compared the outcomes in two batches of 1st professional MBBS students for whom both the exposure i.e. method of TLM employed as well as outcome i.e. scores obtained in the question asked in the Part Completion Test had already occurred.

The study Cohorts consisted of the fresh group of 100 MBBS students admitted in the course in the year 2020-21 and year 2022-23. Both the cohorts were taught the topic of General Anatomy of Nervous System by the same teacher. The method of instruction for the batch of 2020-21 was lecture alone while for the Batch of 2022-23, the lecture on this topic was also followed by an activity- based teaching learning method.

The students of batch 2022-23 were divided into 10 small groups and each group was given a thermocol sheet (30x20 cm), an A4 size paper, few thumb pins and colored woolen threads. The students were instructed by a facilitator to draw a spinal segment and via thumb pins to mark the cell body and woolen threads to mark the axon, mark the situation and course of the axons on the spinal segment as shown in Fig. 1. This activity helped the students to understand clearly the situation of various neuronal

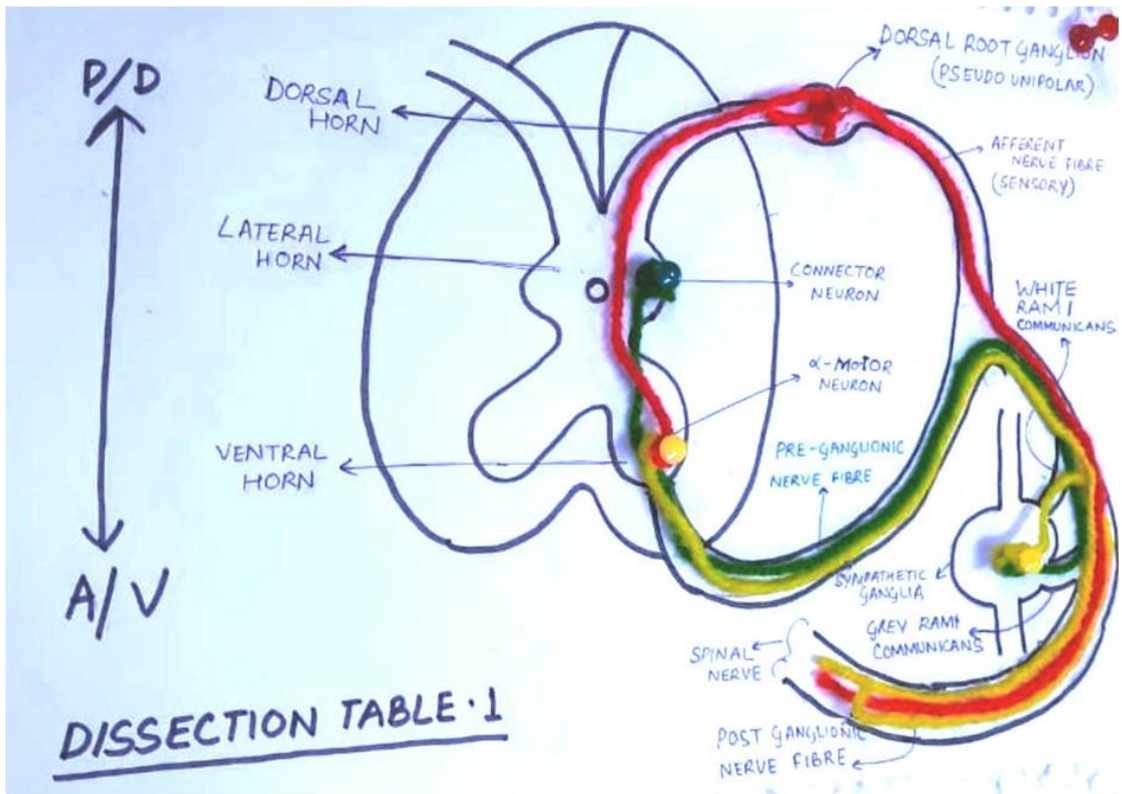


Fig. 1. Activity-based depiction of a spinal segment with its various parts.

bodies, the course of their axons and how they unite and branch to form a typical spinal nerve.

The method of instruction was followed by a Part Completion Test for both the batches of students on a scheduled date. The answer booklets were collected, marked and stored for records which are generally done for three years. For the purpose of study, the answer booklets of General Anatomy were retrieved from the store. The question on the typical spinal nerve was reevaluated by three different evaluators for decreasing bias.

The marks were awarded out of 10 based on the understanding of the concept evident from the diagram drawn by the students and the

explanation written by them. Out of the batch of 100 students, the students who didn't appear for the test were excluded from the study. The marks awarded by all the three evaluators were entered on the same sheet by delineating areas on the sheet [1]. The p-value was calculated by independent T test on the excel sheet by entering the required data by all the three evaluators separately and analyzed.

RESULTS

The mean marks obtained by group 2020-21 were -2.37, 3.19 and 3.33 by the three evaluators respectively, while the mean marks obtained for Batch 2022-23 was 2.88, 3.95 and 3.99 respectively. P-value obtained from the data was calculated separately for all

Evaluators	Cohort-1 Mean for batch 2021-22 (n= 99)(df=98)	Standard deviation for Batch - 2021-22	Cohort-2 Mean for batch 2022-23 (n=100)(df=99)	Standard deviation for Batch -2022-23	P Value
Evaluator-1	2.37	1.82	2.88	2.48	0.05
Evaluator-2	3.19	2.47	3.95	2.92	0.02
Evaluator-3	3.33	2.15	3.99	2.68	0.03
Null hypothesis(H_0 - there is no improvement in learning outcomes by using activity-based teaching along with lecture compared to lecture-based teaching alone as TLM (Teaching learning method)					
Alternative hypothesis H_A - the learning outcomes improve by using activity-based teaching along with lecture as compared to lecture-based teaching alone.					

Table 1. the mean, standard deviation (SD), null hypothesis and alternative hypothesis, calculated p value for each evaluator and mean p value.

the three evaluators and the values obtained were 0.05, 0.02 and 0.03 respectively. The mean of these p-values was 0.03 and hence the result was statistically significant. Table 1 shows the mean, standard deviation (SD), null hypothesis and alternative hypothesis, calculated p value for each evaluator and mean p value. As the P Value obtained was statistically significant (≤ 0.05), the null hypothesis could be rejected, and alternative hypothesis could be accepted [2].

DISCUSSION

The above results show a significant improvement in the mean marks obtained by the students when the method of TLM was activity based small group discussion along with lecture as compared to lecture alone. When the students are involved in the process of teaching and learning it helps in better internalization of concepts and better retention by the students. This was also evident from the diagrams drawn by the

students as these students drew clearer diagrams with correct knowledge of the situation of different structures (Fig1).

Incorporating activity in the TLM is a powerful tool in internalizing the concepts by the students [3]. The results of this study showed that a majority of students scores increased in the lecture followed by activity-based teaching group as compared to the lecture-based group only and also aligned with the study by Answer F [4].

According to Domin (2007) [5] by constructivism, teachers cannot transfer their knowledge to the students. For meaningful learning to take place, learners require to experience an event. Hull (1999)[6] noted rightly that “The majority of students in our schools are unable to make connections between what they are learning and how that knowledge will be used”. ABL is helpful to contextualize the students learning. In an

These activities, if carried out in an effective manner, develop skills like Team-working, Communication, Design and Leadership [8,10,11,12].

There is research evidence which shows that students will retain limited knowledge if they are involved passively in teaching- learning process McKeachie (1998) [8]. The same is indicated in the 'Dale's cone of experience' developed by Dale (1969) [9]. During the 1960s, Edgar Dale theorized that learners retain more information by what they “do” as opposed to what is “heard”, “read” or “observed”. His research led to the development of the Cone of Experience. Today, this “learning by doing” has become known as “experiential learning” or “action learning”.

CONCLUSION

The study of Anatomy requires vivid imagination hence cadaveric dissection helps in the understanding of these concepts. However certain concepts like connection of nerve fibers may not be evident either in gross or histological examination. Such concepts can be made comprehensible to the students by the means of such hands-on activities, and it has better learning outcome as well. Students actively participate in such activities and consider them as a fun learning experience.

CONCLUSION

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