ORIGINAL RESEARCH PAPER

ENT

KEY WORDS: mesotympanum, pars tympanicum, tympanic membrane, middle ear, endoscopic

STUDENTS PERCEPTION OF LEARNING MIDDLE EAR ANATOMY USING ENDOSCOPIC TEACHING AND MODEL TEACHING.

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ABSTRACT

Background: An undergraduate curriculum begins with anatomy, the importance of this knowledge is essential for understanding and contextualizing clinical pathophysiology. Didactic lecture and cadaveric dissection have been the mainstay of anatomical learning. Temporal bone is the complicated bone of the skull and lodges middle ear. Middle ear surgeries requires complete evaluation of middle ear surgical anatomy, mainly posterior tympanic cavity, as it contains many irregular spaces, removal of complete cholesteatoma is a challenge that surgeons face regularly. Endoscopic dissection is the innovative way and aids in viewing of nook and corner of middle ear. **Objective:** To compare the learning effectiveness of students through model teaching and endoscopic teaching of middle ear anatomy on cadaver specimen. **Methods and Materials:** Currently wet sagittal section of face and POP model of middle ear are the materials used for the study. For the new innovative approach, third year MBBS students were divided into two groups containing 30 in each group. Assessment of both the groups was done with questionnaire. Both the groups were assessed with same questions and scoring was done. **Results:** In group A, maximum score was 11 and minimum was 3.25 out of 18. In group B, maximum score was 17.5 and minimum was 5 out of 18. In group A, according to scaling, students fell into poor and average category whereas in group B , students fell into good and very good category as well. **Conclusions:** Analysis identified, statistically significant increase in performance for the endoscopic method compared to model teaching. Overall, the endoscopic approach to middle ear anatomy education is associated to an improved gain in knowledge and more efficient as compared to model teaching

INTRODUCTION

An undergraduate curriculum begins with anatomy, the importance of this knowledge is essential for understanding and contextualizing clinical pathophysiology. Didactic lecture and cadaveric dissection have been the mainstay of anatomical learning.[1]

Nowadays, use of endoscope for diagnostic and surgical procedures is increasing in ENT practice due to clear and wide vision of anatomical structures.[2] Middle ear surgeries requires complete evaluation of middle ear surgical anatomy, mainly posterior tympanic cavity, as it contains many irregular spaces, removal of complete cholesteatoma is a challenge that surgeons face regularly.[3]

Knowledge of anatomy is vital for every surgeon. Middle ear anatomy is complex and is challenging for otologists, who need to explore each and every single compartment for a radical removal of disease. With introduction of the endoscope in middle ear surgery, anatomy of middle ear spaces has become wider and clearer due to a better magnification.[4]

Endoscopic view of middle ear is vital for surgical training program for grommet insertion, canaloplasty, myringoplasty, butterfly tympanoplasty, ossiculoplasty, atticotomy.[5]

Endoscope of angle 0^0 for visualization of long process of incus and medial wall, 30^0 is used for wider visualization.[6] Endoscopic use bypasses the line-of-sight limitations of the external auditory canal, allowing many procedures to be performed via transcanal that might have required a postauricular incision and mastoidectomy for exposure.[7]

Endoscopic dissection needs skill as one hand is used to hold endoscope and other hand for dissection.[8] Visualization of tensor tympanic tendon which is difficult with microscope and hence blind dissection can be prevented by endoscopic dissection as it has wider visualization.[9] Retro and hypotympanum are vital areas as it is the place where cholesteatoma lodges is isualized better in endoscope.[10]

OBJECTIVE

To compare the learning effectiveness of students through model teaching and endoscopic teaching of middle ear anatomy on cadaver specime.

METHODS AND MATERIALS

Currently wet sagittal section of face and POP model of middle ear are the materials used for the study.

For the new innovative approach, third year MBBS students were divided into two groups containing 30 in each group. Assessment of both the groups was done with questionnaire. Both the groups were assessed with same questions and scoring was done. For group A model teaching was done. For group B endoscopic dissection was done in which external auditory canal is dissected first, followed by visualization of tympanic membrane. The tympanic membrane is reflected and the mesotympanum is visualized. For visualization of epitympanum the lateral wall of middle ear is drilled with aid of microscope. Through zero degree, thirty degree endoscope, all the middle ear compartments are shown and explained to the students.

Sequential Dissection Of Middle Ear

Figure 1 -External Ear (Left)

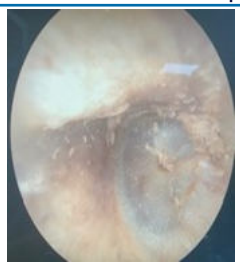


Figure 2- Tympanic Membrane

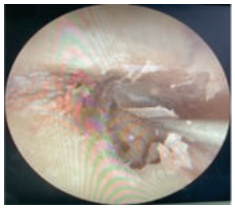


Figure 3 - Reflected Tympanic Membrane

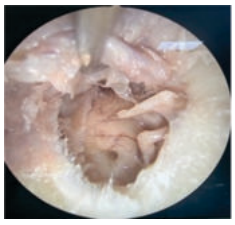


Figure 4 - Middle Ear Cavity

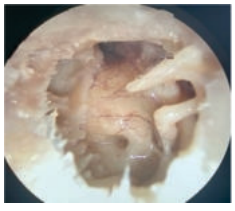


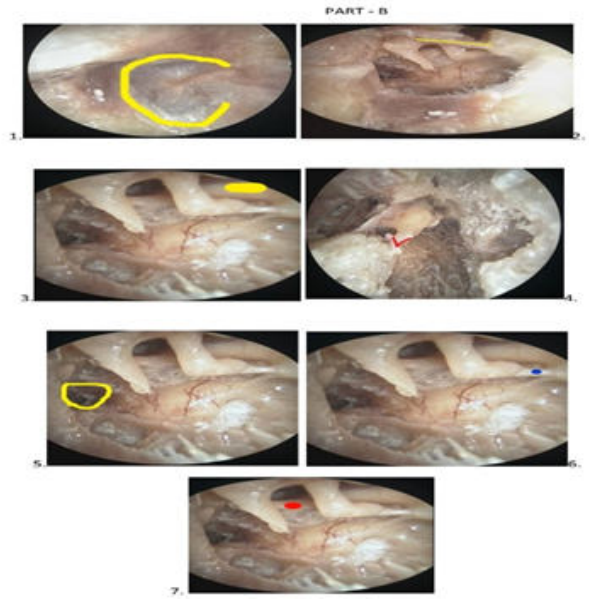
Figure 5 Mesotympanum

Figure 6- Epitympanum

Questionairre was made in such a way, that it contained two parts-Part A and B, part A was one marker and three marker quistions,which assessed their theoretical knowledge. Part B was image based which assessed their practical knowledge

PART - A

1. Contents of epitympanum
2. Contents of mesotympanum
3. Contents of protympanum
4. Important structures in retrotympanum
5. Boundaries of hypotympanum
6. Short process of incus is present in .....
7. Incudomalleous joint is present in .....
8. Facial nerve 2nd genu starts from .....
9. Hypotympanum separates middle ear from .....
10. Tensor tympani attaches to which ossicle.....
11. Chorda tympani runs between which two ossicles



RESULTS

Statistics And Analysis

Analysis of the data was done using independent t test using spss software P value < 0.001 considered significant.

Mean score of group A – 6.8 and standard deviation - 1.88
Mean score of group B – 11.6 and standard deviation- 3.36

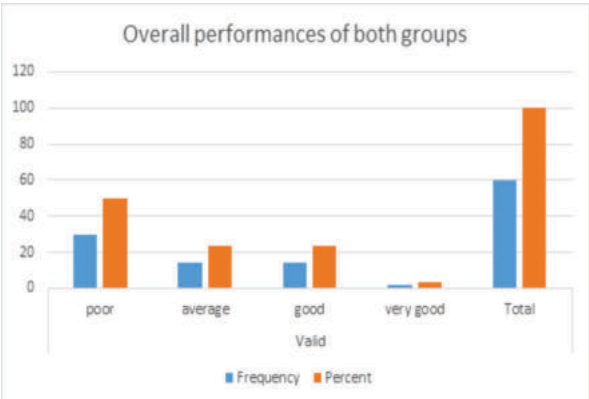
Table 1- Average Score Of Group A And Group B; Group B (endoscopic Teaching) - 11 Scored High.

Group	N	Mean	SD
A	30	6.8	1.88
B	30	11.6	3.36

Table 2- Overall Performance Of Both Groups

	Frequency	Percentage
Poor	30	50.0
Average	14	23.3
Good	14	23.3
verygood	2	3.3
Total	60	100.0

The scoring was done under 4 categories; 2 scored very good and 30 scored poor among all participants.



Graph 1 The Scoring Was Done Under 4 Categories; 2 Scored Very Good And 30 Scored Poor Among All Participants.

Table 3- Distribution Among Group A -24 Scored Poor And 6 Average.

	Frequency	Percent
poor	24	80.0
average	6	20.0
Total	30	100.0

Table 4-distribution Of Group B: 2 -Very Good, 14 - Good, 8 -average, 6 Poor

	Frequency	Percent
Poor	6	20.0
Average	8	26.7
Good	14	46.7
very good	2	6.7
Total	30	100.0

Scaling of scores was done

1. Poor : < 8
2. Average: 8-12
3. Good: 13-15
4. Very Good: >15

In group A, maximum score was 11 and minimum was 3.25 out of 18.

In group B, maximum score was 17.5 and minimum was 5 out of 18.

In group A, according to scaling, students fell into poor and average category whereas in group B , students fell into good and very good category as well.

DISCUSSION

There are studies comparing endoscopic and microscopic dissection which shows endoscopic dissection is more effective.

The primary result was factual and spatial knowledge of anatomic structures of the middle ear as done by quantitative tests administered at baseline and post endoscopic teaching. Secondary result was based on learner interest and overall perception of the learning method, as seen by qualitative questionnaires attended by all participants. There was no vital difference between baseline knowledge of ear anatomy between the Didactic Learning, Computer Model and Holographic groups, confirming adequate randomization of participants before starting the study.[1]

A good knowledge of these anatomical spaces may help in reducing the risk of residual cholesteatoma during middle ear surgery.[4]

Hence, endoscopic teaching gave better understanding as it gave live good visualization of 3D structural view which was difficult to see and understand with models otherwise.

The study was done on 3rd year mbbs students posted in ENT department. Students find middle ear anatomy difficult to understand it and just memorise and pass exam. It also makes them think while taking ENT for their post graduation due to difficulty in learning and understanding anatomy. With the present comparative study we found the student understood better in the endoscopic teaching and answered the test with high marks. They also enjoyed and when asked for feedback, we got positive answers. Hence, we would like to emphasis on endoscopic teaching than usual didactic teaching. Integrated classes with anatomy and ENT can be done and endoscopic teaching would help in gaining more interest among students, better understanding and good doctors ahead. This study helped to understand the loop hole in our education system and gives the interactive way to teach students.

CONCLUSION

Analysis identified, statistically significant increase in performance for the endoscopic method compared to model teaching.Overall, the endoscopic approach to middle ear anatomy education is associated to an improved gain in knowledge and more efficient as compared to model teaching.The students subjectively preferred the endoscopic method of teaching for educational purposes.It was found that the students scored well and maximum marks in endoscopic teaching .New innovative way of teaching anatomy through endoscope should be encouraged in colleges for the benefit of students.

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