ABSTRACT

Objectives: (1) To compare the comprehension of temporal bone anatomy educated with or without a papercraft temporal bone in students attending a speech therapy school (2) To explore the effect of a papercraft for the understanding of the surgical approaches in first year residents

Methods: (1) One-hundred and ten students attending a speech therapy school were divided into 3 classes. The first class was educated with a lecture only. The second class received a lecture and papercraft modelling without instruction. The third class modelled a papercraft with instruction after the lecture. They were tested for the understanding of the temporal bone anatomy. (2) A questionnaire about the understandings of surgical approaches was obtained from 10 residents before and after the papercraft modelling. The modelled papercrafts were cut with scissors to simulate the surgical approaches.

Results: (1) The average scores were 4.4/8 for the first class, 4.3/8 for the second class, and 6.3/8 for the third class. The third class made significantly better results than the other classes (p < 0.01, Kruskal Wallis test). (2) The average scores were 2.6/7 and 4.9/7 before and after the papercraft modelling and cutting. The numerical rating scale score significantly improved (p < 0.01, Wilcoxon signed-rank test).

Conclusion: The papercraft temporal bone model is effective at the first step of learning the temporal bone anatomy and surgical approaches.

INTRODUCTION

The understanding of the temporal bone anatomy is very important, not only for the otologists but also for every medical staff involved in the treatment of hearing loss patients. However, three-dimensional anatomy of the temporal bone is so complicated that education with slides and text books is insufficient. Temporal bone dissection with human cadaver is the gold standard educational program, but it is not available for the paramedical staff including speech pathologists. Recently, the quality of artificial temporal bones is getting high (1), but it is still expensive and requires facilities including a microscope and a drilling system. Computer simulation is another option. It is getting more and more realistic, but it requires a phantom. In addition, it is not so easy to fully understand the 3D anatomy. In 2011, Araki and his colleagues reported the effectiveness of a 3D paper model for learning paranasal sinus anatomy (2).

In this presentation, we develop a papercraft temporal bone and explored its effectiveness in mastering the temporal bone anatomy and surgical approaches.

METHODS

Experiment 1

An examination was conducted for 110 students attending a speech therapy school. The students were divided into 3 classes. The first class was educated with a lecture only. The second class received a lecture and papercraft modelling without instruction. The third class modelled a papercraft with instruction after the lecture. After that, all the students underwent an examination about the basic anatomy of the temporal bone shown below.

Full mark was 8.

1. The malleus is (anterior/posterior) to the Incus
2. The head of the malleus is (anterior/to superior to/posterior/to inferior to/just behind) the tympanic membrane
3. The oval window is (anterior/superior/posterior/inferior) to the round window

Experiment 2

A questionnaire about the understandings of surgical approaches was obtained from 10 residents before and after the papercraft modelling. The answer was scored using a numerical rating scale (0: no understandings, 7: perfect understandings). The questionnaire was as follows.

1. Do you understand the connection among the eustachian tube, the tympanic cavity, the attic, and the mastoid cavity?
2. Do you understand the location of the ossicles?
3. Do you understand the relationship between the cochleariform process and the facial nerve?

PAPERCRAFT TEMPORAL BONE

The papercraft temporal bone is composed of 4 pieces.

The ossicles, the facial nerve, the eminence of the lateral semicircular canal, etc are arranged in a geometrical manner to make the understandings easy.

After the completion of a right ear papercraft model. It takes 30 ~ 60 min to model this papercraft.

You can simulate canal-wall-up mastoidectomy, posterior tympanotomy, transcanal atticotomy, and canal-wall-down mastoidectomy by using scissors.

RESULTS

In our experiment, the examination scores for the temporal bone anatomy were compared. Several charts were used to explain the result, which was described in the presentation.

CONCLUSIONS

The papercraft temporal bone model is effective at the first step of learning the temporal bone anatomy and the surgical approaches.

You can obtain this papercraft temporal bone at http://temporalboneanatomy.blogspot.com/

REFERENCES
