Efficacy of a Porcine Epiglottis versus a 3D Printed Epiglottis in Mimicking the Natural Closure Process during Swallowing Preventing Aspiration of Liquid Utilizing Different Closure Processes

Kennedy, Hannah (School: The Villages Charter High School)

The purpose of this experiment was to find out whether a functional model can be made of an epiglottis utilizing a 3D printed and porcine version, and which of the two would work more efficiently in preventing liquid from passing through. After it was found that there was no significant difference, the researcher created a new model with sensors to function independently when water and food is present. In order to test this, the researcher first ordered all the materials required, then performed a dissection to retrieve the porcine epiglottis. The researcher then 3D printed an epiglottis at The Villages Charter High School. After this, the researcher sutured the epiglotti to the latex tubing attached to the circular board in order to make the model. To test the models, the researcher took ten milliliters from a syringe, pulled the model shut, then poured it into the mouthpiece. After the water drained to the collection basins, the researcher collected and measured the water in milliliters to put into data format. The researcher then recollected the materials, this time using sensors, created an independently functioning model, then used the same procedures to test. After analyzing the data, there was no significant difference between the porcine and 3D pintrinted manual models. The independently functioning sensor model worked the most efficiently, blocking 98.9857% of water flowing into the throat and trachea. This information can be used to create an epiglottis with sensors to implant into patients, significantly increasing their quality of life.

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