

New Innovative Method to Prepare Dry Hollow Organs And Lungs

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Abstract : Preparation of dry hollow organs like stomach, intestine and lungs is very important in understanding their 3 dimensional orientation. In this study simple balloons were used to prepare stomach and intestine; and air compressor pump for lung. The method used was very easy and also cost effective. The outcome of the final specimens was light weight, easy to handle and could be used for the teaching purpose and also could be displayed in museum.

Keywords: Air compressor pump, balloon, dry specimen, hollow organ, lung, stomach

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I. Introduction

Preparation of hollow organs such as stomach, intestines, uterus from animals and humans can be of immense use to understand anatomy as these specimens are dry and can be viewed as 3 dimensional in inflated form. Plastination as described by von Gunther Hagens is useful for solid organs. However to prepare the dry hollow organs and air dry specimens without plastination will be of immense value to understand anatomy, its topography and surgical applications. A simple and cost effective method has been innovated and the study has been undertaken.

II. Materials and methods

Specimens from the formalin fixed cadavers such as stomach, intestine, and lungs were collected, and washed in running water. The fresh specimens can also be used for the preparation. The inner contents were flushed out thoroughly. Simple large size birthday balloons were selected and checked before placing in to the hollow organs. In case of stomach, the balloons were inserted through oesophageal and duodenal opening and inflated by the inflation pump till it assumed its full inflated shape. In case of forestomach of ruminants, small openings were made in the dorsal and ventral sac and blind sacs. Similarly reticulum was also prepared to inflate. Care has to be taken during inflation to avoid bursting of balloon as well as organs. The intestine was prepared with long narrow balloons and not the large balloons. Once the organs were inflated the balloons along with the ends of the organ were tightened and allowed to remain inside. These balloons did not deflate for more than 10 days. During this period the specimen was hanged to dry. Once the specimens dried the balloons were removed. Later the specimens were given varnish coat to give the final shape and appearance. (Fig.1)



Figure 1: Equipments and specimens used in the balloon inflation technique

Similarly the lung was cleaned thoroughly and inflated by the inflation pump. Later the specimen was fixed in an air compressor pump (Fig. 2) and the air was released till it assumed inflated shape demarcating various lobes. The air pressure continued for two to three days till the lung dried. Once the lung dried, it was removed and given a final touch of finishing by the varnish. Later they were displayed permanently in museum and used for teaching. (Fig 3)

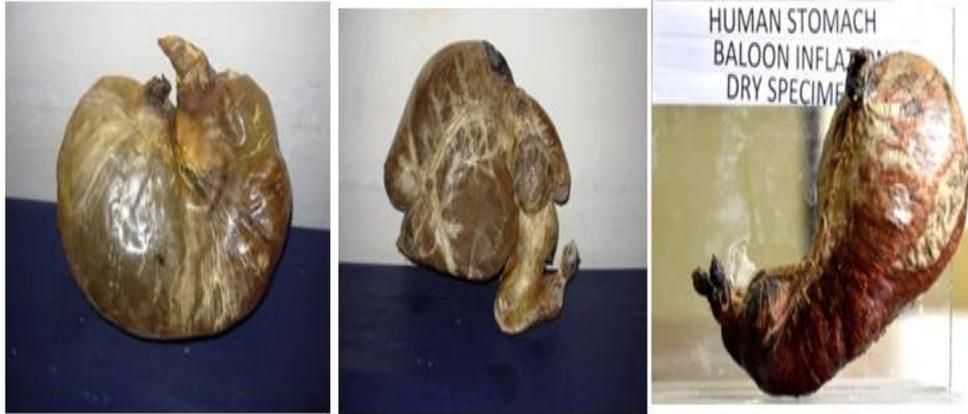


Figure 2: Balloon inflated stomach in horse, buffalo and human stomach



Figure 3: Air dry lungs of human and sheep Figure 4: Air compressor pump



III. Results and discussion

Figure 4 using balloon inflation technique show specimens of human stomach, horse and ruminant stomach. These specimens thus prepared are totally dry and formalin free. Arnautovic et.al. (2005) [1] used expanded foam to prepare dry stomach but to procure the foam needs import process, where as the present preparation needs a simple balloon (Fig 1). The students and teachers can handle freely and learn anatomy. These specimens will give 3D pictures for the surgeons and also to anatomists to learn the division of stomach in to fundic and pyloric parts and parts of forestomach. Dilleswara Rao et. al. (2016) [2] prepared intestine loops after cleaning the contents and filled with thermocol balls. But it will be cumbersome to fill the entire length of intestine to bring the specimen to its normal shape and may not be a feasible solution than this simple balloon method.

Similarly the dry lungs will give the division of lobes and differentiation between right and left lungs. These dry lungs can also give the pathological conditions. Fig 3 shows human right lung with black spots indicating the patient could be chain smoker and also inhaled lot of dust particles from the air. For the dry lung preparation the present method used a simple air compressor pump which is one time purchase. Similar equipment was used by Markarian (1975) [3] and McKiernan and Kneller (1983) [4] also. They made specimens from the lungs of cat, dog, pig and horse. The specimens have proven valuable in anatomy, radiology, pathology, medicine and surgery departments.

IV. Conclusion

The use of balloon in the present study for the hollow organs dry preparation is more innovative and economically cheap. Similarly the dry lung preparation by using compressor pump has advantages over other methods.

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