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Anatomy & Physiology: Current Research

Commentary

The Application of Three-Dimensional Datasets to Improve Understanding of Cardiac Anatomy

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DESCRIPTION

The cardiovascular system is made up of the heart, which is an anatomical pump, and its complicated channels (arteries, veins, and capillaries) that carry blood throughout the human body. The blood includes oxygen, nutrition, wastes, immune and other functional cells that aid in the maintenance of homeostasis and the fundamental activities of human cells and organs. Cardiac anatomy is often taught to medical students by inspection of cadaveric hearts that have been dissected and analysed in the dissecting room. Despite numerous limitations, this strategy has existed for a long time. Due to the complicated three dimensional interrelationships of the heart's component parts, such dissection is known to be difficult. However, detailed understanding of the structure and placement of the cardiac components is vital for those detecting and treating cardiac disease.

When a similar strategy was used, medical students were found not only to appreciate the exposure to three dimensional reconstructions, but also to greatly increase their learning of heart anatomical features. Clinical imaging technological advancements have made it feasible to expose all of the features of cardiac physiology without distorting the linkages to the intrathoracic tissues. Anatomically realistic virtual reconstruction may disclose the complicated three-dimensional interrelationships of its component parts were discussed. One of the basic laws of human anatomy is that all body components must be described as seen from the anatomical position. This implies that the heart should be described in the manner in which it is ordinarily found within the thorax.

However, assessing the interrelationships of the cardiac components in the dissecting room is challenging since the organ itself remains immersed inside the mediastinum and enclosed by the thoracic bone and the lungs. The requirement to detach the heart from the chest in order to distinguish its distinct components is definitely what has led to its traditional description in so called "Valentine" form. The organ is depicted as positioned on its apex in this arrangement, which is now utilized in the vast majority of textbooks used to educate medical students. The atrial chambers are shown incorrectly exactly above the ventricles in the Valentine method, with the right sided components depicted as if actually right sided in comparison to their purportedly left sided counterparts. It is now feasible to display the heart as it is appropriately located within the thorax using pictures generated from datasets created using commercially accessible software employed by doctors.

Careful virtual dissection of three dimensional datasets obtained from living patients now allows exhibition of the required cardiac anatomical features, paralleling the information given by genuine dissection of cadaveric or autopsied hearts. However, because the datasets are gathered with the participants in the anatomical posture, the components are easily defined in accordance with the basic norms of human anatomy, in other words, in an attitudinally suitable manner. Furthermore, these subtle characteristics of cardiac structural anatomy are displayed without distorting their spatial connections inside the thorax. There's no reason why graphics created shouldn't be used to depict cardiac anatomy in all standard textbooks used to teach medical students and clinical trainees. This, in turn, should stress the need of teaching anatomy using attitudinally appropriate nomenclature. When paired with collected fundamental anatomical knowledge, such techniques would undoubtedly bridge the gap that now exists between the dissecting room and the clinical setting, assisting doctors in adopting attitudinal terminology.

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Received: 07-Jan-2022, Manuscript No. APCR-22-372; **Editor assigned:** 10-Jan-2022, PreQC No. APCR-22-372(PQ); **Reviewed:** 24-Jan-2022, QC No. APCR-22-372; **Revised:** 29-Jan-2022, Manuscript No. APCR-22-372(R); **Published:** 5-Feb-2022, DOI:10.35248/2161- 0940.22.02.372.

Citation: Long J (2022) The Application of Three-Dimensional Datasets to Improve Understanding of Cardiac Anatomy. Anat Physiol.12:372.