

Three-dimensional HDlive Thick-Slice Silhouette of Fetal Brain

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ABSTRACT

Three-dimensional (3D) and four-dimensional (4D) ultrasound have improved our knowledge regarding the development of the embryo and fetus and of a great number of fetal anomalies. The great achievement in the field of 3D/4D ultrasound is high definition live (HDlive) technology and HDlive silhouette/flow technology. HDlive silhouette emphasizes the borderlines between organs with different echogenicity and it can be appropriately named as 'see-through fashion'. However, it occasionally appears to demonstrate too many inner structures overlapping one another to understand their relations. The author has cut the volume dataset with a rectangle cube and rendered the cut slice with silhouette ultrasound and called as 'thick-slice silhouette'. Normal brain image in the coronal cutting section by thick-slice silhouette imaging is the picture of the month. This method is useful to identify the inner structure of the organs.

Keywords: HDlive, Silhouette, Thick-slice, Three-dimensional.

How to cite this article: Pooh RK. Three-dimensional HDlive Thick-Slice Silhouette of Fetal Brain. Donald School J Ultrasound Obstet Gynecol 2016;10(1):1-2.

Source of support: Nil

Conflict of interest: None

THICK-SLICE SILHOUETTE OF 18-WEEK-BRAIN

Both three-dimensional (3D) and four-dimensional (4D) ultrasound have improved our knowledge regarding the development of the embryo and fetus and of a great number of fetal anomalies. The great achievement in the field of 3D/4D ultrasound is high definition live (HDlive) technology and HDlive silhouette/flow technology. Advanced technology of HDlive silhouette/flow was released at the end of 2014. The algorithm of HDlive silhouette creates a gradient at organ boundaries, fluid filled cavity and vessels walls, where an abrupt change of the acoustic impedance exists within tissues.^{1,2} By HDlive silhouette mode, an inner cystic structure with

fluid collection can be depicted through the outer surface structure of the body and it can be appropriately named as 'see-through fashion'.¹ The examiner can adjust HDlive silhouette percentage with controlling threshold and gain simultaneously for visualizing target organs of interest.

HDlive silhouette emphasizes the borderlines between organs with different echogenicity, therefore, both the target of interest floating within fluid correction and cystic area in echogenic organs are simultaneously demonstrated. By HDlive silhouette mode, an inner cystic structure with fluid collection can be depicted through the outer surface structure of the body and it can be appropriately named as 'see-through fashion'.^{1,3,4}

The placental surface is demonstrated through the amniotic fluid and report on HDlive silhouette imaging of circumvallate placenta was recently published.⁵

Thus, silhouette ultrasound shows comprehensive structure demonstrating inner and outer morphology simultaneously. However, it occasionally appears to demonstrate too many inner structures overlapping one another to understand their relations. The author has cut the volume dataset with a rectangle cube and rendered the cut slice with silhouette ultrasound. The author calls this silhouette ultrasound demonstration of thick-slice of 3D volume dataset as 'thick-slice silhouette'.⁶ Normal brain image in the coronal cutting section by tomographic ultrasound imaging and the thick-slice



Fig. 1: HDlive thick slice silhouette image of 18-week normal brain Anterior coronal cutting section of normal brain at 18 weeks of gestation. Inner structure of the anterior horns of the lateral ventricles are clearly shown

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silhouette image from the same 3D volume dataset are shown in Figure 1. This method is useful to identify the inner structure of the organs.

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