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3-D ultrasound defines facial clefting prenatally

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While facial clefting is one of the most common congenital malformations, ultrasound detection rates of this anomaly are relatively low. But 3-D ultrasound may help improve the ability to prenatally define the location and extent of lip and palate clefting, according to research published in the October issue of *Radiology*.

A team from the department of obstetrics and gynecology at the Medical University of South Carolina in Charleston, and the departments of radiology and pediatrics at the University of California, San Diego in La Jolla, prospectively evaluated 31 fetuses suspected of having a facial cleft. Fetuses with possible facial clefts as shown on 2-D ultrasound were recruited at three prenatal diagnosis referral centers for 3-D ultrasound ([Radiology, October 2000;Vol.217:1, pp.236-239](#)).

"Two-dimensional fetal evaluations were performed transabdominally with a 128 XP ([Acuson](#), Mountain View, CA) or Ultramark 9 or HDI ([ATL](#), Bothell, WA) unit. Frontal, sagittal, and transverse planes of the fetal face were used to evaluate the integrity of the fetal lip. The transverse plane was used to evaluate the continuity of the fetal primary palate," the investigators wrote.

Three-dimensional scans were obtained with Combison 530 or Voluson 530D ([Medison America](#), Cypress, CA) units.

Of the 31 fetuses scanned with 2-D and 3-D ultrasound, 28 had a cleft lip at birth. Nineteen had a unilateral cleft lip, five had a bilateral cleft lip, and four had a median cleft lip.

Three-dimensional ultrasound correctly detected the location of the cleft lip in all fetuses, while 2-D ultrasound correctly identified the location in 26 (93%) of the cases. Three fetuses were suspected of having a unilateral cleft lip from the 2-D ultrasound scan, but the lip was normal on 3-D ultrasound and at birth, according to the study.

In the 28 fetuses with cleft lip, 22 also had a cleft palate, five had a normal palate, and the status of one palate was not determined at autopsy, according to the researchers. Nineteen (86%) of the 22 cleft palates were detected or suspected from 3-D ultrasound, while only nine (41%) were detected using 2-D ultrasound.

Seven patients found the 3-D image to be useful for deciding whether or not to terminate the pregnancy. In one case, the family opted against termination after viewing the size of the cleft on the reconstructed 3-D image, according to the researchers. The families of another three fetuses proceeded with termination because of a cleft lip or palate on the 3-D rendered image.

The authors observed that the transverse view of the upper lip is useful to confirm the presence of a cleft lip, and that the location of the cleft can be seen more easily in this plane.

Three-dimensional ultrasound offered several advantages for assessing the primary palate in the study:

- * Viewing the fetal face in the standard anatomic orientation allowed confident interpretation, as well as review with family and colleagues.
- * By using the interactive display, the planar views could be manipulated and scrutinized systematically without concern for fetal movement.
- * The planar and surface-rendered image could be manipulated to ensure that loss of signal in the palate defect was not due to transducer angulation and that the view of the face was truly symmetric.
- * In larger palate defects, the hypoechoic area in the palate could be followed on more than one transverse planar image.
- * The rendered image was an important reference image; the exact location of the planar images could be identified relative to the surface-rendered image. This feature decreases the likelihood that the mandible will be mistaken for the palate or that the opening of the nares or nasal passage will be mistaken for a palate defect.

The researchers found that a mixture of surface and light rendering was the optimal display method for viewing facial

clefts on 3-D rendered images. In addition, while the facial cleft may be seen on a 3-D rendered image, all rendered images should be interpreted with planar images to avoid the pitfall of a pseudocleft, according to the authors. Planar images were used to evaluate the palate in this study, while 3-D surface images were used as reference studies.

"Three-dimensional ultrasound may affect a family's decision, since a recognizable image of their fetus is now available to them," the authors concluded. "The defect may be viewed systematically by using an interactive display without concern for fetal movement, with the rendered image providing useful landmarks for the planar images."

Regardless of the type of ultrasound used, however, the integrity of primary palate is difficult to assess with ultrasound in utero, and the patient should be counseled accordingly, the researchers noted.

Radiology abstracts are available at the Web site of the [Radiological Society of North America](#).