

RSNA 2011 B-roll

Satellite Feed Coordinates

Monday, November 28th, 2011

1:00 PM - 1:30 PM ET

Galaxy 28, Transponder 10 (C-Band), Downlink Freq: 3900 Horizontal

Tuesday, November 29th, 2011

1:00 PM - 1:15 PM ET

Galaxy 28, Transponder 10 (C-Band), Downlink Freq: 3900 Horizontal

Script

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RSNA 2011 logo

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This B-roll is provided by the Radiological Society of North America (RSNA) to illustrate press conferences presented Nov. 28 – 30 at the RSNA 2011 Scientific Assembly and Annual Meeting.

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Radiologists and allied professionals are gathering in Chicago this week for the 97th Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA), the world's premier scientific and educational forum in radiology.

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This B-roll contains six segments.

Stations are free to use these visuals according to the embargo dates and times for each segment. All times are Eastern Standard Time.

Preceding each segment is a written description of its content.

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To schedule interviews with study presenters or for additional information, call the RSNA Newsroom at 1-312-949-3233 from Nov. 26 to Dec. 1.

After Dec. 1, call Linda Brooks at 1-630-590-7762.

News releases and abstracts are posted at www.rsna.org/press11.

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Segment 1

Integrated 3-D Imaging Facilitates Human Face Transplantation

Embargoed for release at 12:01 a.m. ET, Monday, Nov. 28

Slate:

By combining conventional medical imaging with some of the same 3-D modeling techniques used in Hollywood blockbusters, researchers are offering new hope to victims of serious facial injuries. Results of a new study on human face transplantation, led by Darren M. Smith, M.D., plastic surgery resident at the University of Pittsburgh Medical Center (UPMC), were presented today at the annual meeting of the Radiological Society of North America (RSNA).

Devastating injuries or defects of the face are extremely challenging, if not impossible, to satisfactorily reconstruct by traditional surgical techniques. In face transplantation, facial tissue from a donor is transferred to reconstruct the defect, restore essential life-sustaining functions—such as breathing, chewing and speaking—and, above all, reestablish normal human appearance.

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“This surgery is for patients with devastating injuries to the face, who have lost their ability to smell, eat and engage socially and have no other conventional treatment options,” said Vijay S. Gorantla, M.D., Ph.D., administrative medical director of the Reconstructive Transplantation Program at UPMC.

Clearly defining and understanding the complex tissue deficits and defects that accompany devastating facial injuries like electric burns, blast wounds and accidental trauma are critical for both technical success and objective analysis of the return of function after face transplantation.

Medical imaging plays a major role in the entire spectrum of face transplantation, ranging from patient selection, donor and recipient surgical planning, and postoperative assessment of returning motor and sensory function. Face transplantation is a lengthy, complicated procedure that involves reconstruction of multiple tissues—such as skin, muscle, blood vessels, nerves and bone—by a team of surgeons.

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Using sophisticated computer modeling software, Drs. Smith and Gorantla, along with Joseph Losee, M.D., integrated information from 3-D CT, CT angiography, MRI and high-definition tractography to create a 3-D model of the patient’s head and neck anatomy. The same type of modeling technology is often used in movies to animate computer-generated characters with detailed three-dimensional human features and realistic expressions.

“We have integrated data from multiple imaging sources into a single 3-D representation that allows for real-time user interaction and modification,” Dr. Smith said. “In assessing

eligibility for this procedure, it is critical to understand whether the patient has enough blood vessels and bone structure to support new facial tissue. This 3-D modeling helps us customize the procedure to the patient's individual anatomy so that the donor tissue will fit like a puzzle piece onto the patient's face."

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Using computer modeling, the team also overlaid the patient model with a polygon mesh of a generic human face and then customized it to the recipient facial anatomy. Dr. Smith said the ability to manipulate this 3-D facial envelope over the residual face model allows the entire surgical team to participate in planning exactly where bone, blood vessel and nerves will be cut and connected, as well as to evaluate the outcomes of reconstructive transplantation, including nerve regeneration within the transplanted facial tissue.

"The goal of face transplantation is not just structural," Dr. Gorantla said. "It is about restoring function, so that patients are once again able to chew their food, smile and regain the most important aspect of a normal face – to look human."

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The following visuals show:

1. Soundbites of Vijay Gorantla, M.D., Ph.D.
2. Soundbite of Darren Smith, M.D.
3. Footage showing Dr. Smith reviewing images.
4. Footage showing a 3-D facial image.
5. Footage showing the attachment of a donor jaw to a 3-D facial image.
6. Footage showing the manipulation of a donor jaw on a 3-D facial image.
7. Still images:
 - Three-dimensional imaging reconstruction of recipient and donor anatomy for facial transplant planning.
 - Stereolithic 3-D modeling of facial bone anatomy for surgical planning.

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Segment 2

Researchers Use CT to Recreate Stradivarius Violin

Embargoed for release at 12:01 a.m. ET, Monday, Nov. 28

Slate:

Using computed tomography (CT) imaging and advanced manufacturing techniques, a team of experts has created a reproduction of a 1704 Stradivarius violin. Three-dimensional images of the valuable violin and details on how the replica was made were presented today at the annual meeting of the Radiological Society of North America (RSNA).

"CT scanning offers a unique method of noninvasively imaging a historical object," said Steven Sirr, M.D., a radiologist at FirstLight Medical Systems in Mora, Minn.

"Combined with computer-aided machinery, it also offers us the opportunity to create a reproduction with a high degree of accuracy."

To create a violin with the same characteristics as the 1704 instrument known as “Betts,” Dr. Sirr worked with professional violin makers John Waddle and Steve Rossow of St. Paul, Minn.

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“We have two goals: to understand how the violin works and to make reproductions of the world’s most prized violins available for young musicians who can’t afford an original,” Dr. Sirr said.

The original violin was scanned with a 64-detector CT, and more than 1,000 CT images were converted into stereolithographic files, which can be read by a computer-controlled router called a CNC machine. The CNC machine, custom-made for the project by Rossow, then carved the back and front plates and scroll of the violin from various woods. Finally, Waddle and Rossow finished, assembled and varnished the replica by hand.

Dr. Sirr, an amateur violinist, first scanned a violin with CT out of curiosity.

“I assumed the instrument was merely a wooden shell surrounding air,” he said. “I was totally wrong. There was a lot of anatomy inside the violin.”

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After he shared those first CT images with Waddle in 1989, the two spent years scanning more than 100 violins—including 29 valuable instruments pre-dating 1827—and other stringed instruments to better understand their composition.

For owners of authentic Stradivarius or other prized violins, CT imaging not only provides a definitive form of identification, it helps establish a pedigree that may increase the value of their investment.

“CT is useful in measuring wood density, size and shapes, thickness graduation and volume measurements,” Dr. Sirr said. “It also provides detailed analysis of damage and repair.”

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The following visuals show:

1. Footage showing a fly through animation of the Stradivari Betts violin.
2. Still images:
 - Photograph of the CNC machine carving the back of the Stradivari Betts violin reproduction.
 - Photograph of the CNC machine carving the back of the Stradivari Betts violin reproduction.
 - This image, derived from the OsiriX DICOM image viewer, is a single frame from a 3-D volume rendered movie of the 1704 Stradivari Betts violin.

- CT scan of the front plate of the original Stradivari Betts violin.

Slate:

Segment 3

'Heading' a Soccer Ball Could Lead to Brain Injury

Embargoed for release at 12:01 a.m. ET, Tuesday, Nov. 29

Slate:

Using diffusion tensor imaging (DTI) to study the effects of soccer 'heading,' researchers have found that players who head the ball with high frequency have brain abnormalities similar to those found in traumatic brain injury (TBI) patients. Results of their study were presented today at the annual meeting of the Radiological Society of North America (RSNA).

Heading, in which players field the soccer ball with their head, is an essential part of the game and the focus of many training drills.

"Heading a soccer ball is not an impact of a magnitude that will lacerate nerve fibers in the brain," said Michael L. Lipton, M.D., Ph.D., associate director of the Gruss Magnetic Resonance Research Center at the Albert Einstein College of Medicine and medical director of MRI services at Montefiore Medical Center in New York. "But repetitive heading could set off a cascade of responses that can lead to degeneration of brain cells."

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DTI, an advanced magnetic resonance (MR) technique, allows researchers to assess microscopic changes in the brain's white matter, which is composed of millions of nerve fibers called axons that act like communication cables connecting various regions of the brain. DTI produces a measurement, called fractional anisotropy (FA), of the movement of water molecules along axons. In healthy white matter, the direction of water movement is fairly uniform and measures high in FA. When water movement is more random, FA values decrease.

Dr. Lipton and colleagues conducted DTI on 32 amateur soccer players (average age: 30.8 years), all of whom have played the sport since childhood. The researchers estimated how often each soccer player headed the ball on an annual basis and then ranked the players based on heading frequency. They then compared the brain images of the most frequent headers with those of the remaining players and identified areas of the brain where FA values differed significantly.

"Between the two groups, there were significant differences in FA in five brain regions in the frontal lobe and in the temporooccipital region," Dr. Lipton said. "Soccer players who headed most frequently had significantly lower FA in these brain regions."

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To assess the relationship between the frequency of heading and white matter changes, the researchers also compared the magnitude of FA in each brain region with the frequency of heading in each soccer player.

“Our goal was to determine if there is a threshold level for heading frequency that, when surpassed, resulted in detectable white matter injury,” Dr. Lipton said.

The analysis revealed a threshold level of approximately 1,000 to 1,500 heads per year. Once players in the study surpassed that level, researchers observed a significant decline in their FA in the five identified brain regions.

“What we’ve shown here is compelling evidence that there are brain changes that look like traumatic brain injury as a result of heading a soccer ball with high frequency,” Dr. Lipton said. “Given that soccer is the most popular sport worldwide and is played extensively by children, these are findings that should be taken into consideration in order to protect soccer players.”

Slate:

The following visuals show:

1. Soundbites of Michael L. Lipton, M.D., Ph.D.
2. Soundbites of study participant Peter Hiattides.
3. Footage showing Dr. Lipton meeting study participant Peter Hiattides.
4. Footage showing a patient being loaded into an MRI scanner.
5. Footage showing a patient being unloaded from an MRI scanner.
6. Footage showing MR images on a monitor.
7. Footage showing a view from the MR control room.
8. Footage showing MR images.
9. Still images:
 - Colored areas represent brain locations where more heading was associated with DTI abnormalities similar to those seen in traumatic brain injury affecting the white matter.

Slate:

Segment 4

Heart Attack Risk Differs Between Men and Women

Embargoed for release at 12:01 a.m. ET, Wednesday, Nov. 30

Slate:

Findings on coronary CT angiography (CTA), a noninvasive test to assess the coronary arteries for blockages, show different risk scenarios for men and women, according to a study presented today at the Radiological Society of North America (RSNA).

Coronary artery disease (CAD) is a narrowing of the blood vessels that supply blood and oxygen to the heart. It is caused by a build-up of fat and other substances that form

plaque on vessel walls. According to the Centers for Disease Control and Prevention, heart disease is the leading cause of death for both men and women in the U.S.

Researchers at the Medical University of South Carolina analyzed the results of coronary CTA on 480 patients, mean age 55, with acute chest pain. Approximately 65 percent of the patients were women, and 35 percent were men. The possibility of acute coronary syndrome was ruled out for each of the patients.

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Using coronary CTA, the researchers were able to determine the number of vessel segments with plaque, the severity of the blockage and the composition of the plaque.

“The latest CT scanners are able to produce images that allow us to determine whether the plaque is calcified, non-calcified or mixed,” said John W. Nance Jr., M.D., currently a radiology resident at Johns Hopkins Hospital in Baltimore, Md.

By comparing the coronary CTA results with outcome data over a 12.8-month follow-up period, the researchers were able to correlate the extent, severity and type of plaque build-up with the occurrence of major adverse cardiac events, such as a heart attack or coronary bypass surgery. The statistical analysis tested all plaques combined (calcified, non-calcified and mixed) and each individual plaque type separately.

“We found that the risks for cardiovascular events associated with plaque were significantly different between women and men,” Dr. Nance said.

Slate:

Within the follow-up period, 70 of the patients experienced major adverse cardiac events, such as death, heart attack, unstable angina or revascularization. In total, 87 major adverse cardiac events occurred among the patients during the follow-up period.

When the outcome data were correlated with the CTA combined plaque findings, the results indicated that women with a large amount of plaque build-up and extensive atherosclerosis are at significantly greater cardiovascular risk than men.

Specifically, the risk for major adverse cardiac events was significantly higher in women than in men when extensive plaque of any kind was present or when more than four artery segments were narrowed.

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“This research tells us that extensive coronary plaque is more worrisome in women than the equivalent amount in men,” Dr. Nance said.

However, when analyzing risk factors associated with the presence of individual types of plaque, the risk for major adverse cardiac events was greater in men, compared to women, when their artery segments contained non-calcified plaque.

Dr. Nance said the new data suggested that the atherosclerotic process, or hardening of the arteries, is not necessarily linear and that more research is needed to better understand the disease.

“Our research confirms that coronary CTA provides excellent prognostic information that helps identify risk, but there are gender differences that need to be considered,” Dr. Nance said.

Slate:

The following visuals show:

1. Footage showing a patient being loaded into a CT scanner.
2. Footage showing a view from the CT scanner control room.
3. Footage showing a radiologic technologist pointing to cardiac CT images.
4. Still images:
 - Computed tomography (CT) scans of the heart allow three-dimensional views of cardiac anatomy, including the coronary arteries.
 - Narrowings of the blood vessels that supply the heart muscles are well seen (left) without the need for invasive coronary catheterization (right).
 - Computed tomography (CT) scans of the heart also allow physicians to see different components of plaque, such as calcium (bright material at large arrow and picture insert) and noncalcified components (dark material at large arrow and picture insert), which are found in different amounts and pose different risks in men and women.

Slate:

Segment 5

Violent Video Games Alter Brain Function in Young Men

Embargoed for release at 12:01 a.m. ET, Wednesday, Nov. 30

Slate:

A functional magnetic resonance imaging (fMRI) analysis of long-term effects of violent video game play on the brain has found changes in brain regions associated with cognitive function and emotional control in young adult men after one week of game play. The results of the study were presented today at the annual meeting of the Radiological Society of North America (RSNA).

The controversy over whether or not violent video games are potentially harmful to users has raged for many years, making it as far as the Supreme Court in 2010. But there has been little scientific evidence demonstrating that the games have a prolonged negative neurological effect.

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“For the first time, we have found that a sample of randomly assigned young adults showed less activation in certain frontal brain regions following a week of playing violent video games at home,” said Yang Wang, M.D., assistant research professor in the Department of Radiology and Imaging Sciences at Indiana University School of

Medicine in Indianapolis. “These brain regions are important for controlling emotion and aggressive behavior.”

For the study, 22 healthy adult males, age 18 to 29, with low past exposure to violent video games were randomly assigned to two groups of 11. Members of the first group were instructed to play a shooting video game for 10 hours at home for one week and refrain from playing the following week. The second group did not play a violent video game at all during the two-week period.

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Each of the 22 men underwent fMRI at the beginning of the study, with follow-up exams at one and two weeks. During fMRI, the participants completed an emotional interference task, pressing buttons according to the color of visually presented words. Words indicating violent actions were interspersed among nonviolent action words. In addition, the participants completed a cognitive inhibition counting task.

The results showed that after one week of violent game play, the video game group members showed less activation in the left inferior frontal lobe during the emotional task and less activation in the anterior cingulate cortex during the counting task, compared to their baseline results and the results of the control group after one week. After the second week without game play, the changes to the executive regions of the brain were diminished.

“These findings indicate that violent video game play has a long-term effect on brain functioning,” Dr. Wang said.

Slate:

The following visuals show:

1. Footage showing a patient being loaded into an MR scanner.
2. Footage showing study co-author Vincent P. Mathews, M.D., reviewing fMR images.

Slate:

Segment 6

Eating Fish Reduces Risk of Alzheimer’s Disease

Embargoed for release at 12:01 a.m. ET, Wednesday, Nov. 30

Slate:

People who eat baked or broiled fish on a weekly basis may be improving their brain health and reducing their risk of developing mild cognitive impairment (MCI) and Alzheimer’s disease, according to a study presented today at the annual meeting of the Radiological Society of North America (RSNA).

“This is the first study to establish a direct relationship between fish consumption, brain structure and Alzheimer’s risk,” said Cyrus Raji, M.D., Ph.D., from the University of Pittsburgh Medical Center and the University of Pittsburgh School of Medicine. “The

results showed that people who consumed baked or broiled fish at least one time per week had better preservation of gray matter volume on MRI in brain areas at risk for Alzheimer's disease."

Slate:

For the study, 260 cognitively normal individuals were selected from the Cardiovascular Health Study. Information on fish consumption was gathered using the National Cancer Institute Food Frequency Questionnaire. There were 163 patients who consumed fish on a weekly basis, and the majority ate fish one to four times per week. Each patient underwent 3-D volumetric MRI of the brain. Voxel-based morphometry, a brain mapping technique that measures gray matter volume, was used to model the relationship between weekly fish consumption at baseline and brain structure 10 years later.

The data were then analyzed to determine if gray matter volume preservation associated with fish consumption reduced risk for Alzheimer's disease. The study controlled for age, gender, education, race, obesity, physical activity, and the presence or absence of apolipoprotein E4 (ApoE4), a gene that increases the risk of developing Alzheimer's.

Gray matter volume is crucial to brain health. When it remains higher, brain health is being maintained. Decreases in gray matter volume indicate that brain cells are shrinking.

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The findings showed that consumption of baked or broiled fish on a weekly basis was positively associated with gray matter volumes in several areas of the brain. Greater hippocampal, posterior cingulate and orbital frontal cortex volumes in relation to fish consumption reduced the risk for five-year decline to MCI or Alzheimer's by almost five-fold.

"Consuming baked or broiled fish promotes stronger neurons in the brain's gray matter by making them larger and healthier," Dr. Raji said. "This simple lifestyle choice increases the brain's resistance to Alzheimer's disease and lowers risk for the disorder." The results also demonstrated increased levels of cognition in people who ate baked or broiled fish.

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"Working memory, which allows people to focus on tasks and commit information to short-term memory, is one of the most important cognitive domains," Dr. Raji said.

"Working memory is destroyed by Alzheimer's disease. We found higher levels of working memory in people who ate baked or broiled fish on a weekly basis, even when accounting for other factors, such as education, age, gender and physical activity."

Eating fried fish, on the other hand, was not shown to increase brain volume or protect against cognitive decline.

Slate:

The following visuals show:

1. Soundbites of Cyrus Raji, M.D., Ph.D.
2. Animation highlighting the positive effects of fish consumption on brain structure in both the right and left hemispheres, particularly in the frontal lobes.
3. Footage showing Dr. Raji reviewing MR images.
4. Footage showing brain MR images.
5. Still images:
 - This image shows a cutaway side view of the right side of the brain illustrating in red, green and yellow colors the beneficial effects of weekly fish consumption on gray matter volume. Hotter colors denote a stronger effect. As was seen with the left side of the brain, consuming fish on a weekly basis is linked to increased gray matter volume in the frontal cortex, posterior cingulate gyrus and temporal cortex on the right side of the brain.
 - This image shows sagittal, coronal and axial views of the main effect of fish consumption on the brain. Higher hippocampal volume with fish consumption is seen at the intersection of the crosshairs in the right hippocampus. Hotter colors denote a stronger effect.

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Portions of this B-roll were filmed at:
Albert Einstein College of Medicine
Indiana University Hospital
The University of Chicago Hospitals
University of Pittsburgh Medical Center

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