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*Embargoed for release on Wednesday, Dec. 3, 2008 at 12:01 a.m. ET***Stress-Related Disorders Affect Brain's Processing of Memory****AT A GLANCE**

- **Researchers using fMRI have found that people with stress-related psychiatric disorders have difficulty suppressing traumatic memories.**
- **The brain's prefrontal cortex, which controls processing of memories, is dysfunctional in patients with stress-related psychiatric disorders.**
- **fMRI is an important tool in understanding psychiatric disorders.**

CHICAGO – Researchers using functional MRI

(fMRI) have determined that the circuitry in the

area of the brain responsible for suppressing

memory is dysfunctional in patients suffering from

stress-related psychiatric disorders. Results of the

study will be presented today at the annual meeting

of the Radiological Society of North America

(RSNA).

“For patients with major depression and

other stress-related disorders, traumatic memories

are a source of anxiety,” said Nivedita Agarwal, M.D., radiology resident at the University of

Udine in Italy, where the study is being conducted, and research fellow at the Brain Imaging

Center of McLean Hospital, Department of Psychiatry at Harvard Medical School in Boston.

“Because traumatic memories are not adequately suppressed by the brain, they continue to

interfere with the patient's life.”

Dr. Agarwal and colleagues used brain fMRI to explore alterations in the neural circuitry that links the prefrontal cortex to the hippocampus, while study participants performed a memory task. Participants included 11 patients with major depression, 13 with generalized anxiety disorder, nine with panic attack disorders, five with borderline personality disorder and 21 healthy individuals. All patients reported suffering varying degrees of stressful traumatic events,

such as sexual or physical abuse, difficult relationships or “mobbing” – a type of bullying or harassment – at some point in their lives.

After reviewing a list of neutral word pairs, each participant underwent fMRI. During imaging, they were presented with one of the words and asked to either recall or to suppress the memory of its associated word.

The fMRI images revealed that the prefrontal cortex, which controls the suppression and retrieval of memories processed by the hippocampus, showed abnormal activation in the patients with stress-related disorders compared to the healthy controls. During the memory suppression phase of the test, patients with stress-related disorders showed greater activation in the hippocampus, suggesting that insufficient activation of the prefrontal cortex could be the basis for inadequate suppression of unwanted traumatic memories stored in the hippocampus.

“These data suggest that the mechanism for memory suppression is dysfunctional in patients with stress-related disorders primarily because of an alteration of the prefrontal cortex,” Dr. Agarwal said. “These patients often complain of poor memory, which might in part be attributed to this altered circuitry,” she added.

According to Dr. Agarwal, fMRI is an important tool in understanding the neurobiological basis of psychiatric disorders and in identifying imaging markers to psychiatric disease, helping clinicians target specific parts of the brain for treatment.

The study's principal investigator is Paolo Brambilla, M.D., Ph.D. Co-authors are Monica Baiano, M.D., Ph.D., Massimo Bazzocchi, M.D., Giuseppe Como, M.D., and Marta Maieron, Ph.D.

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For patient-friendly information on fMRI, visit [RadiologyInfo.org](http://RadiologyInfo.org).

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1-630-590-7738  
lbrooks@rsna.org*Embargoed for release on Tuesday, Dec. 2, 2008 at 12:01 a.m. ET***CT Colonography Offers One-Stop Screening for Cancer and Osteoporosis****AT A GLANCE**

- **CT colonography may be used to screen for both colorectal cancer and osteoporosis.**
- **Bone mineral density measurements obtained with CT colonography were in agreement with dual-energy x-ray absorptiometry (DEXA) scores.**
- **Approximately 10 million Americans have osteoporosis, and 34 million are at risk for the disease.**

CHICAGO – New research reveals that computed tomography (CT) colonography, also known as virtual colonoscopy, has the potential to screen for two diseases at once—colorectal cancer and osteoporosis, both of which commonly affect adults over age 50. Results of the study will be presented today at the annual meeting of the Radiological Society of North America (RSNA).

“With CT colonography, in addition to screening for colorectal cancer, we were able to

identify patients with osteoporosis,” said lead author Rizwan Aslam, M.B.Ch.B., assistant clinical professor of radiology at the University of California San Francisco.

CT colonography, an imaging study performed to detect pre-cancerous polyps in the large intestine, begins with an abdominal CT scan, which creates cross-sectional images of all structures in the abdomen including the spine. Computer software then arranges the CT images to create an interior or “fly-through” view of the colon.

Using the same CT images, another software application can create three-dimensional images of the spine, allowing bone mineral density to be measured. Low bone mineral density is usually associated with osteoporosis, a disease in which bones become fragile and more likely to break.

In the study conducted at the San Francisco Veterans Administration Hospital, the researchers evaluated the results of 35 patients who underwent CT colonography and bone mineral density testing with dual-energy x-ray absorptiometry (DEXA), a standard bone density screening tool. Patients included 30 males and five females ranging in age from 54 to 79.

The results of the study showed excellent agreement between the DEXA bone mineral density scores and the data generated through the CT colonography study.

“The bone density measurements obtained from CT colonography were comparable to the DEXA results,” Dr. Aslam said. “Both tests identified osteoporotic bones.”

Most physicians recommend that adults undergo CT colonography or conventional colonoscopy every seven to 10 years beginning at age 50.

“CT colonography isn’t a replacement for DEXA testing, but it could be a way to screen more people for osteoporosis,” Dr. Aslam said. “When an individual undergoes CT colonography, we can also obtain a bone density measurement with no additional radiation and at minimal cost.”

According to the National Institute of Arthritis and Musculoskeletal and Skin Diseases, 10 million Americans over age 50 have osteoporosis. Approximately 34 million Americans are at risk due to low bone mass. Detecting osteoporosis early provides for early intervention and treatment.

Co-authors are Judy Yee, M.D., Alexander Keedy, B.S., Timothy Joseph, M.D., and Alex Chau, B.S.

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For patient-friendly information on CT colonography and DEXA, visit [RadiologyInfo.org](http://RadiologyInfo.org).

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## **New Breast Imaging Technology Targets Hard-to-Detect Cancers**

### **AT A GLANCE**

- **Breast-specific gamma imaging (BSGI) is an effective method of detecting hard-to-find breast cancer.**
- **BSGI identifies cancers not visible on mammograms and not found by clinical examination.**
- **BSGI findings are based on the metabolic activity of cancer cells.**

**CHICAGO** – Breast-specific gamma imaging (BSGI)

is effective in the detection of cancers not found on mammograms or by clinical exam, according to a study presented today at the annual meeting of the Radiological Society of North America (RSNA).

“BSGI can identify the most difficult to detect breast cancer—invasive lobular carcinoma,” said lead author Rachel F. Brem, M.D., professor of radiology and director of the Breast Imaging and Interventional

Center at The George Washington University Medical Center in Washington, D.C. “It also can help us detect additional lesions of all types of breast cancer in women whose mammograms show only one suspicious lesion.”

Breast cancer affects more women than any other non-skin cancer and, according to the American Cancer Society, accounts for more than 40,000 deaths annually in the U.S. Most experts agree that the best way to decrease breast cancer mortality is through early detection using mammography and clinical breast exam. However, some cancers are difficult to detect with mammography and clinical exam, particularly in the earliest stage when treatment is most effective.

While mammography findings are characterized by the difference in appearance between normal and suspicious breast tissue, BSGI findings are based on how cancerous cells function.

“It is this physiological approach to breast cancer diagnosis that allows for improved cancer detection,” Dr. Brem said.

BSGI is an emerging molecular imaging technology using a high-resolution gamma camera that allows for imaging with very mild compression of the breast along with an injection of a low-dose nuclear material called a radiotracer, which is absorbed by the cells. Because cancerous cells have a higher rate of metabolic activity, the tracer is taken up by these cells at a higher level than in normal cells.

Dr. Brem and colleagues reviewed the records of 159 women with at least one suspicious or cancerous lesion found by mammography or physical exam, who had undergone BSGI to determine if additional lesions were present.

BSGI results showed an additional suspicious lesion missed by mammography and physical exam in 46 (29 percent) of the women. In 14 (36 percent) of the 39 women who underwent biopsy, the newly discovered lesions were cancerous.

“The data suggest that BSGI allows for the diagnosis of more and earlier breast cancers,” Dr. Brem said.

Dr. Brem pointed out that BSGI is not meant to replace mammography, but to be used as an adjunct to mammography. “It is an excellent tool for locating difficult-to-detect cancers and for screening high-risk women who have normal mammograms and physical examination,” she said.

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Disclosure: Dr. Brem is on the board of directors of iCAD, Inc., a board member of Dilon Technologies LLC and a consultant for Orbotech Ltd.

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For patient-friendly information on breast imaging, visit [RadiologyInfo.org](http://RadiologyInfo.org).

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## **MRI Shows New Types of Injuries in Young Gymnasts**

### **AT A GLANCE**

- **Imaging is showing new and unusual injuries to the arms, wrists and hands of adolescent gymnasts.**
- **The study found that some of the gymnasts experience “early death” of a portion of their knuckle bones.**
- **Adolescent gymnasts with overuse injuries to the wrists, hands and knuckles will likely develop early osteoarthritis.**

CHICAGO – Adolescent gymnasts are developing a wide variety of arm, wrist and hand injuries that are beyond the scope of previously described gymnastic-related trauma, according to a study presented today at the annual meeting of the Radiological Society of North America (RSNA).

“The broad constellation of recent injuries is unusual and might point to something new going on in gymnastics training that is affecting

young athletes in different ways,” said the study’s lead author, Jerry Dwek, M.D., an assistant clinical professor of radiology at the University of California, San Diego and a partner of San Diego Imaging at Rady Children’s Hospital and Health Center.

Previous studies have reported on numerous injuries to the growing portion of adolescent gymnasts’ bones. However, this study uncovered some injuries to the bones in the wrists and knuckles that have not been previously described. In addition, the researchers noted that these gymnasts had necrosis, or “early death,” of the bones of their knuckles.

“These young athletes are putting an enormous amount of stress on their joints and possibly ruining them for the future,” Dr. Dwek said.

The radius is the bone in the forearm that takes the most stress during gymnastics. Due to damage to the radial growth plates, the bone does not grow in proportion to the rest of the skeleton and may be deformed. Consequently, it is not unusual for gymnasts to have a longer

ulna than radius. Some former gymnasts must undergo surgery to shorten the ulna and regain the proper fit of the wrist bones into the forearm.

Dr. Dwek and coauthor Christine Chung, M.D., used MRI to study overuse injuries seen in the skeletally immature wrists and hands of gymnasts. The researchers studied wrist and hand images of 125 patients, age 12 to 16, including 12 gymnasts with chronic wrist or hand pain.

“We were surprised to be looking at injuries every step down the hand all the way from the radius to the small bones in the wrist and on to the ends of the finger bones at the knuckles,” Dr. Dwek said. “These types of injuries are likely to develop into early osteoarthritis.”

Dr. Dwek suggested that additional study is needed to understand how gymnastic stresses are causing these injuries.

“It is possible that by changing the way that practice routines are performed, we might be able to limit the stress on the joints and on delicate growing bones,” he said.

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1-630-590-7738  
lbrooks@rsna.org*Embargoed for release on Monday, Dec. 1, 2008 at 12:01 a.m. ET***Breast Cancer Treatment Offers Better Outcome to Women with Implants****AT A GLANCE**

- **Brachytherapy can successfully treat early-stage breast cancer in women with implants and preserve the breast's appearance.**
- **Breast brachytherapy substantially reduces the risk of implant hardening.**
- **Approximately one in eight women who undergo breast augmentation will develop breast cancer during her lifetime.**

CHICAGO – Women with early-stage breast cancer who have undergone breast augmentation may be treated successfully with a partial-breast radiation treatment called brachytherapy, according to a study presented today at the annual meeting of the Radiological Society of North America (RSNA). Patients treated with brachytherapy have better cosmetic outcomes and avoid the risk of the implant hardening, compared to patients who undergo whole-breast radiation therapy.

“We are seeing an increasing number of breast cancer patients with augmentation,” said Robert R. Kuske Jr., M.D., clinical professor at the University of Arizona Health Sciences Center and radiation oncologist at Arizona Oncology Services in Scottsdale, Ariz. “By nature, these women are concerned about their appearance and we need to have options for them.”

According to the American Society of Plastic Surgeons, breast augmentation is the most popular cosmetic surgery in the U.S. with 347,500 procedures performed in 2007. This represents an increase of 64 percent since 2000. Approximately one in eight women who undergo breast augmentation will develop breast cancer at some point in their lives.

The most common breast cancer treatment for patients with breast implants is skin-sparing mastectomy and implant exchange. Whole-breast radiation therapy after lumpectomy is an option, but carries a substantial risk during the healing process of scar tissue wrapping around

the implant, causing it to become rock-hard and extremely painful. This condition, known as capsular contracture, also distorts the appearance of the breast.

Dr. Kuske set out to determine if partial-breast radiation with brachytherapy might offer a better outcome for women with implants wishing to avoid mastectomy.

Breast brachytherapy is a radiation treatment that can be given in higher doses to a small, targeted area of the breast after lumpectomy. Radioactive “seeds” are guided into place through small plastic tubes, or catheters, with the aid of imaging and a computer. The seeds emit high doses of radiation in short bursts.

Scar tissue is minimal, the implant remains unaffected and treatment time is shortened from 6 ½ weeks with whole-breast radiation therapy to five days with brachytherapy.

For the study, 65 women who were diagnosed with small, early stage malignant tumors were treated with brachytherapy after a lumpectomy. The women received two doses per day, separated by six hours, over a five-day period. Follow-up was six months to five years. None of the patients experienced tumor recurrence during the follow-up period. Cosmetic outcome was determined to be good to excellent in 100 percent of patients with 95 percent judged excellent. Implant hardening was not observed in any of the patients.

“Compared to traditional treatments, brachytherapy offers an excellent alternative for these women,” Dr. Kuske said. “It offers very high rates of tumor control with fewer side effects and is easier on their lifestyle.”

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Disclosure: Dr. Kuske is a consultant for Nucletron and for Cianna Medical.

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For patient-friendly information on brachytherapy, visit [RadiologyInfo.org](http://RadiologyInfo.org).

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1-630-590-7738  
lbrooks@rsna.org*Embargoed for release on Monday, Dec. 1, 2008 at 12:01 a.m. ET***Exercise Helps Prevent Age-Related Brain Changes in Older Adults****AT A GLANCE**

- **Researchers used MRI and MR angiography to study brain differences between older adults who exercise and those who don't.**
- **Older adults who exercised three hours per week for 10 years had a greater number of small blood vessels in the brain and better cerebral blood flow.**
- **The researchers used a novel 3-D computer modeling system to analyze vessel characteristics.**

CHICAGO – Older adults who exercise regularly show increased cerebral blood flow and a greater number of small blood vessels in the brain, according to findings presented today at the annual meeting of the Radiological Society of North America (RSNA).

The study, conducted at the University of North Carolina (UNC) – Chapel Hill, is the first to compare brain scans of older adults who exercise to brain scans of those who do not.

“Our results show that exercise may reduce age-related changes in brain vasculature and blood flow,” said presenter Feraz Rahman, M.S., currently a medical student at Jefferson Medical College in Philadelphia. “Other studies have shown that exercise prevents cognitive decline in the elderly. The blood vessel and flow differences may be one reason.”

The researchers recruited 12 healthy adults, age 60 to 76. Six of the adults had participated in aerobic exercise for three or more hours per week over the last 10 years, and six exercised less than one hour per week. All of the volunteers underwent MRI to determine cerebral blood flow and MR angiography to depict blood vessels in the brain.

Using a novel method of three-dimensional (3-D) computer reconstruction developed in their lab, the researchers were able to make 3-D models of the blood vessels and examine them

for shape and size. They then compared the blood vessel characteristics and how they related to blood flow in both the active and inactive groups.

The results showed that the inactive group exhibited fewer small blood vessels in the brain, along with more unpredictable blood flow through the brain.

“The active adults had more small blood vessels and improved cerebral blood flow,” said the study’s senior author, J. Keith Smith, M.D., Ph.D., associate professor of radiology at UNC School of Medicine. “These findings further point out the importance of regular exercise to healthy aging.”

The study was funded by the UNC Biomedical Research Imaging Center and by a grant from the National Institutes of Health.

Co-authors are Elizabeth Bullitt, M.D., Laurence, Katz, M.D., and Bonita Marks, Ph.D.

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lbrooks@rsna.org*Embargoed for release on Monday, Dec. 1, 2008 at 12:01 a.m. ET***Brain Waves Show Sound Processing Abnormalities in Autistic Children****AT A GLANCE**

- **Abnormalities in language processing in children with autism can be identified using magnetoencephalography (MEG).**
- **The brain's auditory processing system is delayed a fraction of a second in children with autism.**
- **Autism affects one in every 150 American children, mostly boys.**

CHICAGO – Abnormalities in auditory and language processing may be evaluated in children with autism spectrum disorder by using magnetoencephalography (MEG), according to a study presented today at the annual meeting of the Radiological Society of North America (RSNA).

“Using MEG, we can record the tiny magnetic fields associated with electrical brain activity,” said Timothy Roberts, Ph.D., vice chair of research in the

Department of Radiology at Children’s Hospital of Philadelphia. “Recorded brain waves change with every sensation, thought and activity. It’s like watching a movie of the brain in real time.”

Typically used for epilepsy evaluation, MEG can also be used to identify timing abnormalities in the brains of patients with autism.

“We found that signatures of autism are revealed in the timing of brain activity,” Dr. Roberts said. “We see a fraction of a second delay in autistic patients.”

Autism is a complex developmental disability that affects approximately one in every 150 American children, mostly boys, according to the Autism Society of America. Autism inhibits the brain functions that govern the development of social and communication skills.

For a MEG exam, a helmet that houses magnetic detectors and looks similar to an old-fashioned hair dryer is lowered over the patient’s head while the patient remains in a seated position. The helmet analyzes electrical currents from the brain.

For the study, 64 patients, age six to 15, with a diagnosis of autism spectrum disorder were evaluated with MEG. Audio stimulation was introduced to the children in the form of beeps, tones in pairs, vowels or sentences. Sounds were presented at different frequencies and tone pairs in rapid succession, including unusual streams of incongruous tones and vowels. The results were analyzed and compared with the results from a control group of age-matched non-autistic children.

The findings showed that in the children with autism there was a fraction of a second delay in the brain's response while processing the rapid succession sounds and the unusual streams, giving researchers an insight into the dysfunction of the auditory processing system in autistic children.

“This delay in processing certain types and streams of sound may underpin the subsequent language processing and communication impairment seen in autistic children,” Dr. Roberts said.

Dr. Roberts predicts that the signatures of autism found in brain activity will become biomarkers to improve classification of the disorder and aid in treatment and therapy planning.

“We hope that in the future these signatures will also be revealed in the infant brain to help diagnose autism and allow earlier intervention,” he said.

Co-authors are J. Christopher Edgar, Ph.D., Deborah M. Zarnow, M.D., and Susan E. Levy, M.D.

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Disclosure: This study was funded by the National Institutes of Health and by the Nancy Lurie Marks Family Foundation.

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lbrooks@rsna.org*Embargoed for release on Tuesday, Dec. 2, 2008 at 12:01 a.m. ET***New Mammography Technology Effective in Detecting Breast Cancer****AT A GLANCE**

- **Positron emission mammography (PEM) is an effective tool for detecting breast cancer.**
- **Dense breast tissue and hormonal status can hinder other breast imaging techniques. PEM shows high sensitivity and is not limited by these factors.**
- **PEM, also known as high-resolution breast PET, has fewer false-positive results than breast MRI.**

CHICAGO – A study has found that positron emission mammography (PEM), a new technique for imaging the breast, is not affected by either breast density or a woman's hormonal status, two factors that limit the effectiveness of standard mammography and MRI at detecting cancer.

Results will be presented today at the annual meeting of the Radiological Society of North America (RSNA).

“The ability of PEM to detect cancer does not appear to be adversely affected by breast density, hormone replacement therapy or menopausal status,” said lead

researcher Kathy Schilling, M.D., director of breast imaging and intervention at the Center for Breast Care at Boca Raton Community Hospital in Florida. “The sensitivity of PEM is equal to or better than breast MRI, and PEM has fewer false-positive results.”

The ability of x-ray mammography, a standard screening tool for breast cancer, to detect lesions is reduced when performed on dense breasts, where tissue is less fatty and more glandular. Breast MRI is effective at detecting cancer in dense breasts and is increasingly being used to screen women at high risk for breast cancer. However, MRI has a high incidence of false-positive test results that indicate cancer is present when it is not. Researchers believe these false positives are due in part to hormonal changes that occur during a woman's menstrual cycle.

“Unless the MRI is performed on day seven through 14 of a woman's cycle, reading MRI images is extremely difficult,” Dr. Schilling said. “This is a significant problem with breast MRI.”

Because hormones do not have the same effect on PEM results, Dr. Schilling believes the imaging technique could play a significant role both in preoperatively evaluating breast cancer patients and in screening high-risk patients.

In the study, 208 patients with breast cancer underwent PEM, an application of high-resolution breast positron emission tomography (PET) in which a small amount of radioactive material is injected into the body to measure metabolic activity and determine the presence of disease. The researchers used a PET unit specially developed for the breast and small body parts to perform the PEM exam.

Of 189 malignant lesions imaged, PEM detected 176 for an overall sensitivity rate of 93 percent. Fifteen percent were ductal carcinoma in situ (DCIS), a noninvasive cancer confined to the ducts of the breast; 85 percent were invasive cancer.

PEM successfully detected cancer in 100 percent of fatty breasts, 93 percent of dense breasts, 85 percent of extremely dense breasts, 93 percent of women both with and without a history of hormone replacement therapy, 90 percent of pre-menopausal women and 94 percent of post-menopausal women.

According to Dr. Schilling, PEM is well tolerated by patients, who sit upright during the exam and are not alone or closely confined as they would be during an MRI exam. While breast MRI exams produce more than 2,000 images to be interpreted, PEM produces just 48 images that can be correlated with a woman's mammogram.

“PEM is easier to use, easier to interpret and easier on the patients than MRI,” Dr. Schilling said. “It is also ideal for those patients whose MRI is difficult to interpret due to hormonal influences, women with implants, patients with metal in their bodies, or patients who suffer from claustrophobia. It is exciting that we now have a functional imaging approach with high sensitivity that compliments our current anatomic imaging modalities,” she added.

Co-authors are Deepa Narayanan, M.S., and Judith Kalinyak, M.D., Ph.D.

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Disclosure: Dr. Schilling is a consultant for Johnson & Johnson and sits on the scientific advisory board of Naviscan PET Systems, Inc. Her co-authors are employees of Naviscan PET Systems, Inc.

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## **New Treatment Eliminates Heel Pain Caused by Plantar Fasciitis**

### **AT A GLANCE**

- **A new ultrasound-guided outpatient technique is an effective treatment for plantar fasciitis.**
- **The 15-minute procedure eliminated pain and inflammation in 95 percent of patients within three weeks.**
- **Plantar fasciitis is the most common cause of heel pain, affecting one million people annually in the U.S.**

CHICAGO – Combining an ultrasound-guided technique with steroid injection is 95 percent effective at relieving the common and painful foot problem called plantar fasciitis, according to a study presented today at the annual meeting of the Radiological Society of North America (RSNA).

“There is no widely accepted therapy or standard of care for patients when first-line

treatments fail to relieve the pain of plantar fasciitis,” said the study’s lead author, Luca M. Sconfienza, M.D., from Italy’s University of Genoa. “Our new technique is an effective, one-time outpatient procedure.”

Plantar fasciitis, the most common cause of heel pain, is an inflammation of the connective tissue called the plantar fascia that runs along the bottom of the foot, from the heel to the ball of the foot. The condition accounts for 11 percent to 15 percent of all foot symptoms requiring professional care and affects one million people annually in the U.S.

Conservative treatments, which may take up to a year to be effective, include rest, exercises to stretch the fascia, night splints and arch supports.

When the condition does not respond to conservative treatments, patients may opt for shockwave therapy, in which sound waves are directed at the area of heel pain to stimulate healing. Shockwave therapy is painful, requires multiple treatments and is not always effective.

Complications may include bruising, swelling, pain, numbness or tingling and rupture of the plantar fascia. In the most severe cases of plantar fasciitis, patients may undergo invasive surgery to detach the fascia from the heel bone.

For this study, Dr. Sconfienza and colleagues used a new ultrasound-guided technique, along with steroid injection, on 44 patients with plantar fasciitis that was unresponsive to conservative treatments.

After injection of a small amount of anesthesia, the anesthetic needle is used to repeatedly puncture the site where the patient feels the pain. This technique is known as dry-needling. Dry-needling creates a small amount of local bleeding that helps to heal the fasciitis. Lastly, a steroid is injected around the fascia to eliminate the inflammation and pain. The technique is performed with ultrasound guidance to improve accuracy and to avoid injecting the steroids directly into the plantar fascia, which could result in rupture.

After the 15-minute procedure, symptoms disappeared for 42 of the study's 44 patients (95 percent) within three weeks.

“This therapy is quicker, easier, less painful and less expensive than shockwave therapy,” Dr. Sconfienza said. “In cases of mild plantar fasciitis, patients should first try noninvasive solutions before any other treatments. But when pain becomes annoying and affects the activities of daily living, dry-needling with steroid injection is a viable option.”

Co-authors are Francesca Lacelli, M.D., Giovanni Serafini, M.D., Giacomo Garlaschi, M.D., and Enzo Silvestri, M.D.

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## **Radiologists Diagnose and Treat Self-Embedding Disorder in Teens**

### **AT A GLANCE**

- **Radiologists have begun using a minimally invasive, image-guided technique to detect and remove objects inserted by teens into their arms, hands, feet, ankles and necks.**
- **This is the first study to report on an emerging condition known as self-embedding disorder.**
- **Self-embedded objects removed included needles, staples, paper clips, wood, stone, glass, pencil lead and a crayon.**
- **Self-injury has been reported in 13 to 24 percent of high school students in the U.S. and Canada.**

CHICAGO – Minimally invasive, image-guided treatment is a safe and precise method for removal of self-inflicted foreign objects from the body, according to the first report on “self-embedding disorder,” or self-injury and self-inflicted foreign body insertion in adolescents. The findings will be presented today at the annual meeting of the Radiological Society of North America (RSNA).

“Radiologists are in a unique position to be the first to detect self-embedding disorder,

make the appropriate diagnosis and mobilize the healthcare system for early and effective intervention and treatment,” said the study’s principal investigator, William E. Shiels II, D.O., chief of the Department of Radiology at Nationwide Children’s Hospital in Columbus, Ohio.

Self-injury, or self-harm, refers to a variety of behaviors in which a person intentionally inflicts harm to his or her body without suicidal intent. It is a disturbing trend among U.S. adolescents, particularly girls. Prevalence is unknown because many cases go unreported, but recent studies have reported that 13 to 24 percent of high school students in the U.S. and Canada have practiced deliberate self-injury at least once. More common forms of self-injury include cutting of the skin, burning, bruising, hair pulling, breaking bones or swallowing toxic substances. In cases of self-embedding disorder, objects are used to puncture the skin or are embedded into the wound after cutting.

Dr. Shiels and colleagues studied 19 episodes of self-embedding injury in 10 adolescent girls, age 15 to 18. Using ultrasound and/or fluoroscopic guidance, interventional pediatric radiologists removed 52 embedded foreign objects from nine of the patients. The embedded objects included metal needles, metal staples, metal paperclips, glass, wood, plastic, graphite (pencil lead), crayon and stone. The objects were embedded during injuries to the arms, ankles, feet, hands and neck. One patient had self-embedded 11 objects, including an unfolded metal paperclip more than six inches in length.

Ultrasound guidance allowed the researchers to detect the presence and location of wood, crayons and plastic objects, not detectable on x-ray examinations. Removal was performed through small incisions in the skin that left little or no scarring and was successful in all cases, without fragmentation or complications.

“This technique offers surgeons and emergency physicians a safe and effective alternative for removal of foreign bodies, including objects at risk for fragmentation during traditional operative techniques,” said co-author Adam Young, B.S. “The small incision minimizes scarring and deformity, which is key for the self-esteem of this unique, high-risk group of patients.”

Co-authors are James Murakami, M.D., Brian Coley, M.D., and Mark Hogan, M.D.

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## **Patient Photos Spur Radiologist Empathy and Eye for Detail**

### **AT A GLANCE**

- **Including a patient's photo with a medical imaging file may result in a more meticulous interpretation of results and helps radiologists empathize with the patient.**
- **Patient photographs may reveal medical information including suffering and physical signs of disease.**
- **Many radiologists have limited contact with patients, especially with the advent of teleradiology.**

CHICAGO – Including a patient's photo with imaging exam results may enable a more meticulous reading from the radiologist interpreting the images, as well as a more personal and empathetic approach, according to a study presented today at the annual meeting of the Radiological Society of North America (RSNA).

“Our study emphasizes approaching the patient as a human being and not as an anonymous case study,” said lead author Yehonatan N. Turner,

M.D., radiology resident at Shaare Zedek Medical Center in Jerusalem, Israel.

Many radiologists have limited contact with patients. A referring physician will order imaging exams, such as MRI or computed tomography (CT), and the radiologist interprets the results, never having met the patient.

Technological advances have further distanced the radiologist from interaction with the patient. With the advent of teleradiology, radiologists are now able to view images from remote locations via the Internet or satellite.

“We feel it is important to counteract the anonymity that is common in radiologic exams, especially with the growth of teleradiology,” Dr. Turner said.

The researchers set out to determine if the addition of a patient's photograph to the file would affect how radiologists interpreted the results.

For the study, 318 patients referred for CT agreed to be photographed prior to the exam. The images of the patients were added to their files in the hospital's picture archiving and communication

system (PACS), a network for storage and retrieval of medical images. The photograph appeared automatically when a patient's file was opened.

After interpreting the results of the exams, 15 radiologists were given questionnaires to gather data about their experience. All 15 radiologists admitted feeling more empathy towards the patients after viewing their photos. In addition, the photographs revealed medical information such as suffering or physical signs of disease.

More importantly, the results showed that radiologists provided a more meticulous reading of medical image results when a photo of the patient accompanied the file.

Incidental findings are unexpected abnormalities found on an image that may have health implications beyond the scope of the original exam. In order to assess the effect of the photographs on interpretation, 81 examinations with incidental findings were shown in a blinded fashion to the same radiologists three months later but without the photos. Approximately 80 percent of the radiologic incidental findings reported originally were not reported when the photograph was omitted from the file.

The radiologists involved in the study commented that while the addition of the photo did not lengthen the time spent reading, it was a factor in how meticulously they interpreted the images. All 15 radiologists agreed that the inclusion of a photograph in a patient's file should be adopted into routine practice. The photos can also be included in long-distance teleradiology practices.

“The photos were very helpful both in terms of improving diagnosis and the physicians' own feelings as caregivers,” Dr. Turner said. “Down the road, we would like to see photos added to all radiology case files.”

Co-authors are Irith Hadas-Halpern, M.D., and David Raveh, M.D.

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1-630-590-7738  
lbrooks@rsna.org*Embargoed for release on Wednesday, Dec. 3, 2008 at 12:01 a.m. ET***Robotic Technology Improves Stroke Rehabilitation****AT A GLANCE**

- **Researchers are using a new robotic grip device to rehabilitate chronic stroke patients.**
- **This is the first study using fMRI to map the brain in order to track stroke rehabilitation.**
- **The study found that the brain is malleable for a longer period of time after stroke than previously thought, making permanent rehabilitation possible even after six months.**

CHICAGO – Research scientists using a novel, hand-operated robotic device and functional MRI (fMRI) have found that chronic stroke patients can be rehabilitated, according to a study presented today at the annual meeting of the Radiological Society of North America (RSNA). This is the first study using fMRI to map the brain in order to track stroke rehabilitation.

“We have shown that the brain has the ability to regain function through rehabilitative exercises

following a stroke,” said A. Aria Tzika, Ph.D., director of the NMR Surgical Laboratory at Massachusetts General Hospital (MGH) and Shriners Burn Institute and assistant professor in the Department of Surgery at Harvard Medical School in Boston. “We have learned that the brain is malleable, even six months or more after a stroke, which is a longer period of time than previously thought.”

According to the Centers for Disease Control and Prevention, stroke is the third leading cause of death in the U.S. and a principal cause of severe long-term disability. Approximately 700,000 strokes occur annually in the U.S., and 80 percent to 90 percent of stroke survivors have motor weakness.

Previously, it was believed that there was only a short window of three to six months following a stroke when rehabilitation could make an improvement.

“Our research is important because 65 percent of people who have a stroke affecting hand use are still unable to incorporate the affected hand into their daily activities after six months,” Dr. Tzika said.

Dr. Tzika is an affiliated member of the Athinoula A. Martinos Center for Biomedical Imaging in the Department of Radiology at MGH, where the research is ongoing.

To determine if stroke rehabilitation after six months was possible, the researchers studied five right-hand dominant patients who had strokes at least six months prior that affected the left side of the brain and, consequently, use of the right hand.

For the study, the patients squeezed a special MR-compatible robotic device for an hour a day, three days per week for four weeks. fMRI exams were performed before, during, upon completion of training and after a non-training period to assess permanence of rehabilitation. fMRI measures the tiny changes in blood oxygenation level that occur when a part of the brain is active.

The results showed that rehabilitation using hand training significantly increased activation in the cortex, which is the area in the brain that corresponds with hand use. Furthermore, the increased cortical activation persisted in the stroke patients who had exercised during the training period but then stopped for several months.

“These findings should give hope to people who have had strokes, their families and the rehabilitative specialists who treat them,” Dr. Tzika said.

Co-authors are Dionyssios Mintzopoulos, Ph.D., Azadeh Khanicheh, Ph.D., Bruce Rosen, M.D., Ph.D., Loukas Astrakas, Ph.D., and Michael Moskowitz, M.D.

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## **Portable CT Increases Chance of Stroke Survival and Recovery**

### **AT A GLANCE**

- **Using a portable CT scanner in a hospital emergency room may increase the number of patients successfully treated for stroke within the critical three-hour window by 86 percent.**
- **Most stroke victims are treated at small community hospitals where access to CT may be limited.**
- **Stroke is the third leading cause of death in the U.S.**

CHICAGO – New research has found that the availability of a portable eight-slice computed tomography (CT) scanner in an emergency room can significantly increase the number of stroke victims who receive a potentially life-saving treatment. Results of the study, conducted at North Shore Medical Center (NSMC)-Salem Hospital in Salem, Mass., will be presented today at the annual meeting of the Radiological Society of North America (RSNA).

“The hospital’s acquisition of a portable CT scanner facilitated more rapid assessment of acute stroke patients and is anticipated to increase the number of patients to whom thrombolytic therapy can be administered,” said the study’s lead author, David B. Weinreb, M.D., now a resident physician in the Department of Radiology at Hospital of Saint Raphael in New Haven, Conn.

According to the National Institute of Neurological Disorders and Stroke (NINDS), stroke is the third leading cause of death in the U.S., and more than 700,000 cases of stroke are diagnosed annually. The most common kind of stroke, ischemic stroke, occurs when a blood clot blocks a blood vessel in the brain. Such strokes can be treated with thrombolytic therapy using a drug called tPA that dissolves the blockage. However, the window of opportunity to safely administer the medication is generally considered to be just three hours. Also, it is important to determine that there is no bleeding in the brain before administering tPA. One out of six strokes is caused by bleeding rather than clotting.

“tPA is usually the only shot we have at clot-induced ischemic strokes,” Dr. Weinreb said. “But it needs to be administered in a closely monitored situation, because the drug can have extremely adverse effects in those patients whose strokes are instead due to bleeds.”

Before a patient receives tPA, a head CT must be performed to ensure there is no bleeding in the brain. NINDS recommends that patients who arrive in the emergency room (ER) with signs of acute stroke undergo CT imaging within 25 minutes.

For the study, Dr. Weinreb and colleagues began using a portable CT scanner to assess stroke patients in the ER of NSMC-Salem Hospital. During the month prior to the acquisition of the portable scanner and for a four-month period following its installation, researchers measured how much time elapsed between a physician order for a head CT and performance of the scan.

The availability of the CT scanner in the hospital’s ER reduced the time between the order and exam from 34 minutes to 15 minutes, a reduction of 54 percent. Based on simulation modeling, the researchers estimated that this improvement would increase by 86 percent the number of stroke patients able to be treated with thrombolytic therapy within the three-hour window.

According to Dr. Weinreb, most stroke patients are taken to relatively small community hospitals where access to CT scanning may be limited. When a CT scanner is available, it is not always in proximity to the ER, making transportation of critically ill patients to the radiology department both difficult and time-consuming.

“A portable eight-slice CT can be easily added and used to accurately identify a head bleed in a stroke or trauma patient,” Dr. Weinreb said. “This new technology is able to solve a very important problem for a community hospital, where the majority of stroke victims are being treated.”

Co-author is James E. Stahl, M.D.

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Disclosure: Dr. Weinreb consults as a medical writer for Neurologica.

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