In 1986, Hologic revolutionized the field of osteoporosis testing with the invention of DXA, establishing the gold standard in bone densitometry. Since then, our dedicated team of scientists and engineers has pioneered many technological innovations that have addressed the emergent needs of our customers and have further strengthened our leadership position in this field. We have listened closely to our customers and developed diagnostic solutions that enable them to offer the patients the highest quality of care. Some of our notable achievements include OnePass™ fan-beam acquisition, high-definition Instant Vertebral Assessment™ (IVA-HD), and Advanced Body Composition™ analysis. Our densitometry platform is designed to go beyond the traditional bone density exam, assisting physicians in assessing three critical health concerns – osteoporosis, cardiovascular disease and obesity.

This past August, we once again changed the face of densitometry with the introduction of the Horizon™ DXA platform — a new, powerful solution designed to take bone densitometry to the next level. Horizon DXA provides higher quality images, better patient throughput, and reduced interpretation time to improve patient management and clinical outcomes. It is the only densitometer available with the Single Energy (SE) Femur exam, a 15-second scan of the entire femur to assist physicians in identifying features associated with atypical femur fractures (AFF). AFF is a debilitating complication associated with the prolonged use of bisphosphonates and other anti-resorptive therapies used for the treatment of osteoporosis.

We are committed to creating innovative technologies that identify diseases earlier, improve patient outcomes while optimizing workflow efficiencies. Our mission is to help people everywhere keep their lives in motion.
Defining Atypical Femur Fractures

In response to the growing concern about the connection between bisphosphonates and atypical femur fractures, the American Society of Bone and Mineral Research (ASBMR) convened a task force in 2010 to research the issue. Their report broke new ground in the understanding of atypical femur fractures (AFF), prompting the FDA to issue a drug safety warning that long-term use of bisphosphonates to treat osteoporosis is associated with the risk of atypical femur fractures.

Dr. Harry K. Genant, Professor Emeritus of Radiology, Orthopaedic Surgery, Medicine, and Epidemiology at the University of California, San Francisco was the musculoskeletal radiologist on the taskforce.

“The role of the taskforce was to establish criteria and develop the working definition of atypical femur fracture, including the major and minor features. In particular, I was tasked with helping to describe the radiographic features,” explains Dr. Genant.

New Data Leads to Revision

Earlier this year, the taskforce updated its report, redefining critical major and minor features of AFF. “The taskforce reviewed recent literature published on the subject of atypical femur fractures, and determined that some of the material in the first report was outdated and not sufficient for the current understanding of the diagnosis and management of these fractures,” explains Dr. Genant. “The new report emphasizes the importance of recognizing that AFFs fall within the family of stress or insufficiency fractures.”

In the 2013 report, we require that four out of five major features must be present for a fracture to be classified as a complete AFF. Several of the new major features of AFF are critical, including the importance of the lateral femoral cortical appearance. The report identifies the “fracture line originating at the lateral cortex and being substantially horizontal in its orientation” as a major feature of AFF. This was not specified in the initial report in 2010. Another new major feature of the revised criteria is the periosteal reaction seen in the lateral cortex.

Other major features of AFF include, minimal or no trauma, and complete fractures extend through both cortices and may be associated with a medial spike; incomplete fractures involve only the lateral cortex. Additionally, the fracture must be non-committed, but may have minimal convolutions. In the previous report, a minimally comminuted fracture was excluded, notes Dr. Genant.

“When we updated the definition of atypical femur fracture, we established that the location of the fracture was extremely important,” continues Dr. Genant. “First and foremost is the requirement the atypical femur fracture must be located along the femoral diaphysis, just distal to the lesser trochanter and proximal to the distal supracondylar flare.”

The task force also identified several minor features which may be present, but none of these are required for a diagnosis of atypical femur fracture. The minor features include: generalized increase in cortical thickness, unilateral or bilateral prodromal symptoms of pain in the groin or thigh, bilateral complete or incomplete fractures and finally, delayed healing of the fractures.

The task force noted that patients might experience incomplete fractures, which initiate at the lateral cortex. “The appearance of a radiolucent cleft in an incomplete AFF is important because if it is discretely observed it substantially increases the likelihood the patient could experience a complete fracture,” states Dr. Genant.

State-of-the-art DXA Systems Help Identify Incomplete AFF

“With respect to the incomplete fractures, recent work has demonstrated that state-of-the-art DXA systems are able to image the entire femur and provide an excellent rendition of these incomplete fracture. The periosteal and endosteal reactive changes are readily discernible and often the radiolucent zone can be well seen.”

Atypical femur fractures can be difficult to see, but Dr. Genant has reviewed state-of-the-art DXA images and conventional radiographs, and found he can see the radiolucent zone representing the incomplete fracture of the lateral femoral cortex equally well on both images. However, he notes that “With DXA imaging, one can obtain an image of the entire femur in one projection, while typically with radiographs one has a composite of a proximal image and a distal image of the femur.”

By applying these new diagnostic technologies, the potential is there to determine at a much earlier stage in the patient’s use of bisphosphonate treatment if they are developing atypical femur fractures. Early diagnosis affords the opportunity to affect patient outcomes for the better.

“When we updated the definition of atypical femur fracture, we established that the location of the fracture was extremely important...”

Dr. Harry K. Genant
Implementing a 15-Second Exam to Prevent Atypical Femur Fractures

“There’s a tremendous potential with the SE Femur Exam to identify the subset of people at risk for atypical femur fracture (AFF). If a patient develops AFF, the medical management is long, painful, and complicated, and their lives change dramatically because of these fractures.”

Larry Jankowski, CBDT

Jankowski performs the SE Femur scan directly after a hip scan, while the patient is already positioned, so there is no impact on the workflow. “The operator simply clicks on the SE Femur button, uses the mouse to set a start position, and hits enter,” explains Jankowski. “We schedule bone density patients every 30 minutes. We can add the SE Femur Exam without extending our schedules.”

Identifying Patients At Risk for AFF

Jankowski is working with Dr. Amanda Myers, the Medical Director of the Osteoporosis Center at the Illinois Bone and Joint Institute, to develop guidelines for incorporating the SE Femur Exam into their clinical practice. “If a patient has been on bisphosphonates or other powerful anti-resorptive agents like denosumab continuously for more than five years, or at any time if they complain of new thigh or groin pain or weakness during treatment, it makes sense to add the SE Femur Exam during their bone density scan being done to monitor that treatment,” explains Jankowski. “For new patients, we might consider acquiring baseline SE Femur scans when they begin bisphosphonates, and again at five years or if thigh pain is present. If there’s no change in the shape of the femurs, they might be allowed to stay on bisphosphonates, if that is the best therapy for them. But if you start to see suspicious changes in the morphology, we have the great potential, through early identification and conservative interventions, to prevent AFF’s from going onto complete failure and surgical repair.”

Another advantage of the SE Femur Exam, notes Jankowski, is that it completes the scan in a single pass. With a rectilinear scanner the fan beam goes back and forth over the area several times and merges and averages images within the overlapping areas. If the fracture line is located within the overlapping area, it could be hidden. The SE Femur Exam takes a single pass so there’s no interposition of overlapping passes.

A Rare But Life-Changing Complication

Although Jankowski has seen only a handful of patients in the past five years with atypical femur fracture, he believes it is partly “because it is a rare complication of bisphosphonate treatment for osteoporosis and partly because we weren’t looking for AFF before.” Jankowski adds “The SE Femur is a simple, point of service, survey of the femurs that can be done at the time of a standard bone density exam, rather than having to do bilateral femur x-rays. In many ways, this parallels the way we use VFA to identify suspected vertebral fractures rather than having to refer patients to have lumbar and thoracic spine radiographs.”

Larry Jankowski, CBDT

Chicag0, Illinois //

Hologic Images for Life Skeletal

Instant Vertebral Fracture Assessment (IVA) exam delivers the best resolution for vertebral fracture assessment; close to the image quality of conventional radiographs so I suggested Hologic adapt their technology and develop an imaging technique for AFF.

It Takes 15 Seconds To Scan The Entire Femur

The SE Femur Exam only adds 15 seconds to an existing bone density exam. That’s important to patients, reports Jankowski, because many are older with arthritis in their knees and hips, and to remain in position for three or four minutes for a scan would be very uncomfortable. The efficiency of the exam also is important to Jankowski whose department scans more than 15 patients a day, “It may not seem like much, but other technology can take three to four minutes which can add up to an extra hour or two of scan time plus positioning. If the patient moves because of pain you have to stop and restart, which adds additional time.”

Jankowski performs the SE Femur scan directly after a hip scan, while the patient is already positioned, so there is no impact on the workflow. “The operator simply clicks on the SE Femur button, uses the mouse to set a start position, and hits enter,” explains Jankowski. “We schedule bone density patients every 30 minutes. We can add the SE Femur Exam without extending our schedules.”

Identifying the Fracture Line

The AFF fracture line occurs horizontally across the lateral cortex. It is a very fine, less than a millimeter and can be very difficult to see through the cortical beaking or thickening. “The SE Femur images are as good as the radiographs we take of femurs,” states Jankowski. “In fact, I think they may look a little better, there is less scatter so the bone edges are sharper.”

Jankowski recalls one case where the SE Femur scan showed intricate and finely detailed calcifications of the femoral artery and branches extending the entire length of the femur. “I could see this fine a level of detail in calcifications outside the bone, I knew I can see just as well inside the bone.”

Larry Jankowski

“The SE Femur images are as good as the radiographs we take of femurs.”

Larry Jankowski, CBDT

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Reducing the Risk of Atypical Femur Fracture for Osteoporosis Patients

For one Boston radiologist, the addition of Horizon’s Single Energy (SE) Femur Exam will be a valuable tool in his armamentarium for the identification and treatment of atypical femur fractures.

Atypical femur fracture (AFF) may be a complication from prolonged use of bisphosphonates and other anti-resorptive therapies for the treatment of osteoporosis. Because of the debilitating nature of these fractures, the condition has gained considerable attention in the past year from the medical community.

Dr. Harold Rosen, Director of the Osteoporosis Prevention and Treatment Center at Beth Israel Deaconess Medical Center in Boston, Massachusetts monitors and treats 1,000 patients annually for osteoporosis. He also runs the bone densitometry unit at Beth Israel and provides DXA bone density exams for an additional 5,000 patients annually at three different hospital sites.

“The risk of atypical femur fracture is very low, very low within the first five years of treatment with bisphosphonates and may even occur in untreated patients,” states Dr. Rosen. “However, there may be an association between AFF and patients that have been on oral bisphosphonate treatment for more than five years, receive intravenous bisphosphonates for more than three years, or who take both corticosteroids and bisphosphonates.”

To avoid the possible risk of AFF, Dr. Rosen typically transitions the majority of patients from oral bisphosphonates after five years or IV bisphosphonate after three years. However, Dr. Rosen notes a substantial number of patients are not candidates for anabolic treatment or a drug holiday and must continue on bisphosphonates. Also, those on corticosteroids represent a real challenge, as they have both increased osteoporotic fracture risk and increased AFF from their steroid use. Although continued bisphosphonate treatment is sometimes the best option for particular subsets of patients, prolonged users may be at increased risk of developing atypical femur fractures.

“I have one patient with severe osteoporosis, her T score is less than -4 and she has multiple vertebral compression fractures. Normally, I would transition to anabolic treatment but the patient is not a candidate for Fortico because of her prior history of breast cancer and radiation treatments. As a result, this patient has been on bisphosphonate treatments for more than five years and will continue with this treatment for at least ten years. It is the right treatment for this patient, but it may put her at risk of AFF. With the SE Femur Exam, I will be able to proactively monitor her for early signs of AFF.”

Early Detection Changes the Outcomes

Today, Dr. Rosen is looking forward to acquiring the new Hologic Horizon DXA bone densitometry platform which offers the SE Femur Exam. This capability will allow Dr. Rosen to visualize features indicative of AFFs, such as focal reaction or thickening along the lateral cortex of the femoral shaft, which may be accompanied by a transverse radiolucent line.

“AFF is very subtle,” explains Dr. Rosen. “The radiolucent line is often difficult to see but the Horizon SE Femur Exam provides the resolution we need to screen for cortical thickening or beaking. This 15-second exam will enable us to produce a high resolution image of the entire femur with a low effective radiation dose so we can determine at a much earlier stage if the patient is developing an AFF and take appropriate medical and/or surgical action to prevent completion. The SE Femur Exam should help reduce the number of patients who may need surgical intervention for completed AFF.”

Dr. Rosen believes the ability to screen selected patients annually with the SE Femur Exam will also provide the peace of mind that patients can continue on bisphosphonates without developing AFF. “Horizon will allow us to be more proactive,” states Rosen. “I will have the capability to screen patients at very specific points in their treatment, and I can perform the scan during their regularly scheduled DXA exam. There’s no need to make another appointment or travel to another facility.”

“I am looking forward to using this technology,” concludes Dr. Rosen. “Horizon will be a valuable tool enabling us to prevent the debilitating complication of AFF for some patients, and at the same time provide reassurance that patients who need bisphosphonates for more than five years are not developing this rare potential complication.”

Dr. Michael Cromer, the Center’s Founder, used to send his bone density patients to local hospitals and other facilities for testing but compliance wasn’t great and patients complained about the experience.

“How often does a doctor suggest having a test done, and there’s no follow-through?”

Dr. Cromer saw a need and he acted on it. “During my 23 years in practice, I have always tried to stay on the cutting edge and thereby improve the quality of tests as possible. When I realized that DXA machines were moving into the clinical arena, in part because there’s no specialized two-year degree required for operation, I decided to do some research to see if it made sense for us.”

For Dr. Cromer, the best way to test the waters was to go direct to the source: his own patients for whom he had previously prescribed DXA testing. He asked a simple question: Would you consider having your bone density testing done here in our office? “Nearly 100 percent of my patients answered, “Yes.” They loved the idea of having medical professionals with whom they know and trust take care of as many of their healthcare needs as possible,” says Dr. Cromer. “We have found that only half of our patients realize the value of bone density testing, so we take the time to make sure they understand why we’re recommending it and we try to answer all of their questions. Because we are their primary care doctors, we can talk about the DXA results in context with their overall health, which helps ensure that their care is more cohesive.”

After making conservative calculations based on 50 percent of his patients actually having DXA testing done at the Center, Dr. Cromer determined that he would generate enough revenue by screening just seven patients a month to cover his expenses. Once he determined the patient convenience and Center cost benefit, Dr. Cromer took a close look at two different machines.

For him, the obvious choice was the Hologic Discovery™ bone densitometry system. “The reporting capabilities on Discovery were superior with clear, concise professional reports generated for each patient. Plus the system is very easy to use, and the software was easy for my staff to learn. Hologic also provided a two-day training course for four of my medical assistants.”

The Center now performs an average of 30 scans a month, which includes both bone density test and instant vertebral fracture assessment (IVA). MA is a unique capability that allows physicians to identify spine fractures with one rapid, low-dose, single-energy image at double the resolution of previously available techniques.

In less than 4 years, Dr. Cromer rescued the investment he made in the Hologic Discovery system. Since then, DXA testing has generated an additional $42,000 in revenue every year – monies that would have otherwise been lost if the Center had to continue referring patients to other sites. Moreover, maintenance has been minimal; since the system was installed seven years ago, the equipment has never broken down.

“We use the system once a day, on average, and we have only needed Hologic service once – when a patient accidentally rubbed up against the joystick and it had to be replaced. Nothing else has been an issue in all that time.”

Offering ancillary services such as DXA testing has helped fuel the Center’s growth. During the summer of 2012, Dr. Cromer and his two partners opened a satellite clinic eight miles north of the main center, called Sunlake Family Practice. Now patients from the Sunlake practice are referred to Northwest Family Medical Center for DXA testing.

Dr. Cromer does offer some advice for any practice thinking about adding DXA testing. “If you think you don’t have space for the system, you might want to think again. Installing the Discovery system only requires an 8’ X 8’ space and the machine itself can have a wide range of tests done right here, including bone density testing. DXA has been a big win-win for us: it’s great for our patients, great for our business and great for our future.”

Providing Comprehensive Bone Density Testing Isn’t Just Good for Patients, It’s Also Great for Business

For Northwest Family Medical Center, the largest practice of its kind in Hillsborough County, Florida, providing comprehensive bone density testing isn’t just good for patients, it’s also great for business.
High-tech Body Composition Analysis Contributes to the Success of a Thriving Sports Medicine Practice

The Washington Institute of Sports Medicine is one of the few places in the country to offer the latest in DXA Body Composition Analysis, a fast, highly accurate and comprehensive test used to determine muscle, fat and bone content.

The Institute began providing DXA Body Composition Analysis in 2011, when it installed a Hologic Discovery™ bone densitometry system. While DXA scanners are commonly used to measure bone density and to estimate fracture risk, the Institute is one of the few sports medicine practices that uses the Hologic system to measure bone, fat and muscle mass. Body Composition Analysis details exactly where fat and lean muscle mass are distributed throughout the body and provides a comprehensive report summarizing the results.

“The high-density image resolution was one of the reasons we chose the Hologic system. Its imaging capabilities are incredible,” notes Dr. Parker. “When we show the results to patients, they can immediately see the exact distribution of their lean and fat content. And we carefully review the analysis with each patient so that they can see a clear pathway forward to reach their goals, even giving them their ideal values for body weight, fat weight, percent body fat, lean muscle, as well as the number of fat pounds they should lose. The Institute’s reports also show an estimate of essential fat versus stored fat, allowing patients to understand that sometimes their weight goals are unrealistically low, which would cut into their essential fat (what’s needed for health and essential bodily functions). Follow-up exams show exactly where and how much muscle was gained and fat lost.”

Dr. Parker chose the Hologic Discovery system for another key reason: It is the only DXA system that incorporates the National Health and Nutrition Examination Survey (NHANES) whole system body composition reference database. “It allows us to give each patient their percentile information so that they can compare themselves to other individuals of similar age, gender and race,” he notes.

In their first two years of operation, Dr. Parker and his staff have conducted more than 1,200 DXA body composition scans. Thirty percent were given to athletes. “The testing can help coaches and athletes formulate a training program designed to help build muscle, lose fat or both. It can also help trainers, physical therapists and coaches monitor fat gain and muscle atrophy after an injury, and then adapt rehabilitation workouts, rest and nutrition plans to reflect the athlete’s specific needs,” explains Dr. Parker.

DXA Body Composition analysis isn’t reserved just for athletes. About 50 percent of patients scanned at the Institute have weight issues. Understanding where fat is deposited can help determine a patient’s risk for specific health problems. “For example, women who carry extra weight in the abdominal region, versus their hips, are at higher risk for all kinds of diseases, including heart disease, cancer and diabetes,” Dr. Parker says. “Using this information to provide individual patient education is paramount in lowering these health risks before they manifest major health problems.”

The remaining 20 percent of patients who come in for a DXA scan are often planning to start a fitness program or will be making nutritional changes and want an accurate, detailed baseline analysis of their ideal weight. So why not just get on a scale? Or for that matter, what’s wrong with other techniques for determining body composition and ideal weight, like BMI, skin calipers, underwater weighing or sitting in a pod?

“Those techniques are either outdated, too general or error prone,” says Dr. Parker. “DXA Body Composition Analysis is so much more accurate and easier for our patients,” he emphasizes. “There’s no need to dunk them in water, pinch their fat, or ask them to sit in a claustrophobic egg chamber – and no false results. Patients are simply required to lie still for six minutes on a platform table, fully dressed, while the DXA scanner moves over their body.”

What’s more, business continues to grow. “Having performed 500 DXA Body Compositions Scans in the first year of service, and 700 in the second year, we are now up to almost 60 scans per month. We expect to reach over 100 per month in our fifth year of operation. I feel that we could not have met this level of success with any DXA manufacturer other than Hologic. The Hologic Discovery system gives us the quality of data and the high-density imaging necessary for our patients to be willing to buy into the whole program and for them to achieve the experience they expect. The professional quality of the Hologic system matches up well with the professional quality of The Washington Institute of Sports Medicine, our program and our staff.”

DXA Body Composition Analysis is so much more accurate and easier for patients than first generation tests. “There’s no need to dunk them in water, pinch their fat, or ask them to sit in a claustrophobic egg chamber – and no false results. Patients are simply required to lie still for six minutes on a platform table, fully dressed, while the DXA scanner moves over their body.”

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“The high-density image resolution was one of the reasons we chose the Hologic system. Its imaging capabilities are incredible.”

Dr. David Parker
Introducing the future of DXA.
We were the first company to introduce an X-ray densitometer. Now we’ve done it again with the new Horizon™ DXA System. Featured on Horizon, is the NEW Atypical Femur Fracture (AFF) Assessment, a technique to assess a serious side effect of common long-term osteoporosis treatments. Hologic has the only FDA cleared system that can conduct this type of exam.

Learn more about the Horizon DXA System by visiting Hologic.com