

HOSPITAL FOR
SPECIAL SURGERY:
SPECIALISTS IN
MOBILITY
WINTER 2007

Horizon



**Focus on the
Foot and Ankle**



**At the Forefront
of Foot and Ankle
Treatment**

Jonathan T. Deland, MD, (left), and his colleagues are pioneering a number of surgical treatments and approaches for a range of complex disorders with a goal of preserving maximum function.

Focus on the Foot and Ankle

At the turn of the 20th Century, Royal Whitman, MD, a surgeon with the New York Society for the Ruptured and Crippled – the precursor to Hospital for Special Surgery – made international history with his surgical procedure for stabilizing flail-like ankle joints that often resulted from infantile paralysis.

Dr. Whitman's work established the Hospital's worldwide reputation in the treatment of foot and ankle disorders and launched a legacy of innovation that continues to this day under the leadership of Jonathan T. Deland, MD, Chief of the Foot and Ankle Service.

When you consider that each foot has more than 25 bones supported by three groups of ligaments and that your feet log on average 1,000 miles per year, it is no surprise that conditions of the foot and ankle affect millions each year. "The Hospital's Foot and Ankle Service is one of the largest and most active services in the country," says Thomas P. Sculco, MD, Surgeon-in-Chief. "From non-operative conditions to the most complex

trauma and deformities in children and adults, our physicians are committed to relieving pain and returning patients to their normal activities. Through basic and clinical research, this outstanding team is also seeking to improve techniques for treating these often challenging disorders."

Making Strides

In June 2004, Zarela Martinez suffered a fracture in the tibia and the fibula of her right leg and a torn ACL. "I had treatment for my knee, but by putting all the pressure on my left foot to compensate, one day it just turned totally, and I couldn't walk," recalls Ms. Martinez. A restaurateur whose demanding life includes managing her Manhattan restaurant and promoting her own line of products, Ms. Martinez could ill afford the disability.

"Ms. Martinez had a complex foot and ankle problem that affected her posterior tibial tendon – the soft tissue that supports the arch," explains Andrew J. Elliott, MD, one of seven orthopedic surgeons with the Hospital's Foot and Ankle Service. "She developed a flat foot with severe pain." Dr. Elliott performed reconstruction surgery to provide Ms. Martinez with a more normal functioning foot that would enable her to return to her very active life.

Posterior tibial tendon insufficiency suffered by Ms. Martinez is of great interest to Special Surgery's foot and ankle specialists. "When the posterior tibial tendon and ligaments that support the arch gradually give way, the foot starts to change shape, deform, and collapse," says Dr. Elliott. "Patients can present with pain on

Pacesetters

The Foot and Ankle Service of Hospital for Special Surgery – with seven dedicated orthopedic surgeons – is the largest of its kind in the country. Patients benefit from the individual and collaborative expertise and pioneering research of (left to right) David S. Levine, MD, Matthew M. Roberts, MD, Martin J. O'Malley, MD, Walther H.O. Bohne, MD, Jonathan T. Deland, MD, Chief, Andrew J. Elliott, MD, and John G. Kennedy, MD, who are expertly trained in the full range of foot and ankle disorders.



the inner side of their ankle radiating into the mid part of their foot. The tendon can develop either a partial tear or degeneration called tendinosis. When the tendon fails, the ligaments can also fail.”

The degenerative process of tendinosis can affect not only the posterior tibial tendon, but also any of the other tendons that support the foot and ankle. “Physical therapy is usually the first line of defense,” continues Dr. Elliott. “While this may not heal the problem, physical therapy can provide the patient with relief of their discomfort and return them to an acceptable level of functioning.” When the problem begins to interfere with normal activities, however, surgery may be needed to either reconstruct the tendon or to debride or remove the diseased portion.

At the same time, Dr. Elliott and his colleagues are looking at ways to minimize the surgical trauma and avoid having to disturb the tendon itself. “Radiofrequency is a new technique that we are evaluating not only for its role in providing pain relief, but also as a means of stimulating the healing process within the damaged tendons,” he says. According to Dr. Elliott, a small radiofrequency blast is used to cause an isolated

controlled area of damage to the tendon. This then stimulates the body’s healing response.

Ankle Insights

Martin J. O’Malley, MD, Director of the Foot and Ankle Fellowship, spends a lot of time behind a camera – one so small that it fits inside an ankle joint. Ankle arthroscopy allows Dr. O’Malley to peer inside using the smallest of instruments and a very tiny fiber optic camera. “The ankle is a small, very tight joint,” notes Dr. O’Malley. “With the ankle, you have to use a distractor to pull the ankle joint apart just to get in. Once you get in, it’s difficult to operate because you have such a limited space. Often, the cartilage you need to reach is blocked by the tibia. We had to find innovative ways to gain access to these injuries without big incisions, and get the cartilage to heal so patients can return to their activities.”

Dr. O’Malley uses ankle arthroscopy to treat many athletes, particularly basketball players and dancers, whose injuries can put an end to their careers. “These athletes often develop bone spurs in the front of their ankles that we can treat arthroscopically. With a professional athlete, our goal is to treat the injury as minimally invasive as possible to speed their recovery, which can take four to six months if it is an osteo-

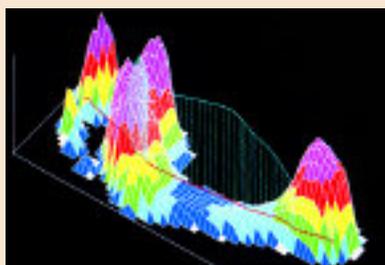
chondral injury involving both cartilage and bone. This is a very common condition for us and we are trying to find a way to treat it without doing too much damage to the ankle joint and, at the same time, trying to promote healing biologically. We are constantly working on ways to help these injuries heal.”

Addressing Athletic Injuries

The foot and ankle are the most commonly injured joints in recreational and elite athletes. Injuries can range from ankle sprains, stress fractures, and osteochondral lesions to nerve, ligament, and tendon damage.

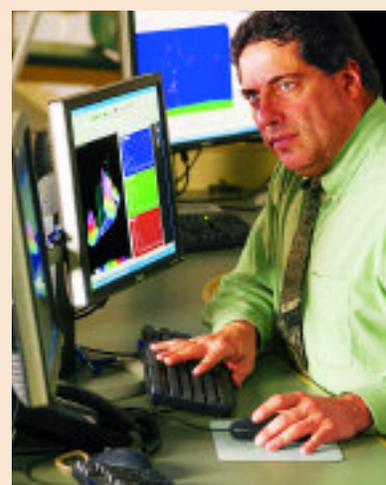
“The goal of treatment is to provide a rapid return to sports activities, while addressing any mechanical or biologic causes of the initial injury,” says John G. Kennedy, MD. “All athletes, whether elite or weekend warriors, young or old, share the same goal – that is to return to function in as short a time possible.”

Many injuries can be addressed with non-surgical strategies, and the use of external bone stimulators has increased the rate of return to sport for many athletes with stress fractures. This is augmented by a biomechanical evaluation in the running lab to prevent future injury wherever possible. According to Dr. Kennedy, over 90 percent of ankle sprains can be



Gait Keepers

Howard J. Hillstrom, PhD, Director of the Leon Root, MD, Motion Analysis Laboratory, uses sophisticated technology, including 3D multicolored animation of the pressures beneath one’s feet, to quantify how someone walks, runs, or stands. A staff of research engineers and physical therapists evaluate patients for range of motion, muscle function, alignment, reflexes, and any anomalies to appreciate the patient’s structure before measuring function.





All Together Now

Traumatic injuries to the foot and ankle often require pins and other hardware to reconstruct fractured bones not only to ensure they heal correctly, but, as David S. Levine, MD, explains, to improve the joint's alignment and reduce deformity with a goal toward minimizing the development of arthritis.

treated without surgery, once the cause of the injury is determined, with precisely directed physical therapy.

An Arch Enemy

“People who have a high-arched foot, or cavus foot, can suffer from a constellation of foot and ankle problems. The presentation may be subtle,” says Matthew M. Roberts, MD. “It is like having one leg of a tripod that is too long, making it unstable. As a result, high arches are associated with recurrent ankle instability or sprains. This instability needs to be addressed; otherwise, there is an increased risk for ankle arthritis.”

Notes Dr. Roberts, it is important to determine if cavus foot is responsible for other problems in the foot in order to provide the appropriate treatment. “For example,” he says, “if we operate on a peroneal tendon injury and don’t address the high arch, the tendon repair may not heal correctly.”

Forefoot Deformities: What Lies Beneath

Metatarsalgia is a forefoot deformity often mistaken for bunions. With metatarsalgia, patients have pain accompanied by a bony prominence on the ball of their foot. “To surgically address the most severe problems

of metatarsalgia,” says Dr. Deland, “we correct the alignment of the toe, including the bunion if there is one, and shorten the prominent bones. This requires very precise judgment. If we can take pressure patterns in the OR using a device that stimulates weight bearing, we can determine the amount of correction needed for the best possible outcome.”

Treating Trauma

“Most acute injuries to the foot and ankle – unless they are open fractures or dislocations – are not surgical emergencies,” says David S. Levine, MD. In fact, cautions Dr. Levine, the majority of injuries to the foot and ankle should not be surgically treated immediately because they are often associated with significant swelling. “We have a great respect for, and need, to be careful of these injuries,” he says. “We call it ‘respecting the soft-tissue envelope.’ If we add too much surgical trauma on top of the injury too soon, wound healing may not occur.”

Dr. Levine and his colleagues call on the Hospital’s imaging capabilities (CT or MRI scanning) to learn about a fracture’s complexity, as well as its soft-tissue injury, well before entering the OR to fix the fracture. “The main reason we perform surgery following traumatic injury is to

improve a joint’s alignment, reduce its deformity, and to minimize the potential for developing arthritis,” says Dr. Levine.

One of the more common surgeries performed by the Hospital’s foot and ankle surgeons is open reduction and internal fixation. “Open reduction means you make an incision to visualize the fracture, then perform a reduction, putting the fragments back together,” explains Dr. Levine. Internal fixation involves the placement of metallic hardware to create stability until the bone can restore itself to its original state. Certain fractures can be done less invasively through limited incisions, reducing the trauma to the soft tissue caused by the surgery and promoting a more rapid recovery of that soft tissue envelope. These techniques have been advanced over the past decade with the introduction of instruments and hardware tailored for use within the small confines of the foot and ankle.

Concerned about preventing the loss of bone density or disuse osteoporosis in patients during the six-week, post-surgical recovery period in which an ankle must not bear weight, Dr. Levine, with Joseph M. Lane, MD, Chief of the Hospital’s Osteoporosis Center, is beginning a study of the protective effects of

Sound Advice

Ultrasound technology, which allows the Hospital’s radiologists to look in great detail at soft tissue around joints, tendons, and muscles, has become an important tool for diagnosing foot and ankle problems. Sound waves are sent and received through a small hand-held device known as a transducer (above). The returning sound waves are used to produce the images that can indicate abnormalities.



High Arches, Big Problems

According to Matthew M. Roberts, MD, a cavus or high-arched foot is associated with ankle instability leading to arthritis, sesamoid injuries under the big toe, plantar fasciitis or heel pain, stress fractures of the outer metatarsals, and peroneal tendon disorders on the side of the ankle. Says Dr. Roberts, “Unless you recognize that someone has a high arch, you are only treating the symptoms and not correcting the basic problem.”



osteoporosis therapies, such as Actonel. Notes Dr. Levine, “We want to prevent patients recovering from an ankle fracture from developing a regional osteoporosis in their leg and therefore be put at greater risk for a fragility fracture in the future.”

Ankle Replacement: A Continuing Challenge

When arthritis pain in the ankle joint can no longer be managed without surgery, ankle fusion or ankle replacement are the only methods available to control pain and retain function. “While ankle fusion will relieve pain and allow the foot to still move adequately, it puts stress on other joints, potentially leading to more arthritis,” notes Dr. Deland. “Ankle replacement puts less stress on other joints and provides a more normal gait pattern, but we are worried about durability.”

Pursuit of a successful prosthetic ankle joint has been ongoing for decades. The pressure on the ankle is three times that of the hip or knee, making it more difficult to replace. “Because the ankle is such a small joint, there is only so much space in which to place the implant,” notes Dr. O’Malley. The Hospital’s foot and ankle surgeons continue to search for the ideal prosthetic ankle joint, and Dr. Deland recently participated in a

multicenter study by the Food and Drug Administration (FDA) of the Scandinavian Total Ankle Replacement (STAR) device, which is now awaiting FDA approval. In addition, Dr. Deland, in collaboration with Charles Saltzman, MD, Chairman of Orthopaedics at the University of Utah, and others are designing a more anatomically correct ankle replacement and expect to bring this new model to market within the next few years.

Blending Science and Surgery

The Foot and Ankle Service continually draws on the research interests and expertise of its surgeons to develop and refine treatments. Posterior tibial tendon insufficiency is a major focus of the research of Dr. Deland, who is well-known for his expertise in this area. With support from the National Institutes of Health and the Orthopaedic Research and Education Foundation, he is developing and perfecting surgical procedures for posterior tibial tendon insufficiency that preserve motion and function in the foot while achieving good alignment. Surgery involves not only reconstructing the tendon, but also moving the heel – which helps support the foot and restore alignment – back into place.

A grateful patient, Susan Rose, helped make possible the establishment of an outcomes research center for the Foot and Ankle Service. The Center is evaluating surgical outcomes for patients with posterior tibial tendon insufficiency, cartilage problems, and other conditions and allows the Hospital’s surgeons to follow patient progress and improve treatments. “This is a big step forward,” says Dr. Deland.

More severe deformities that cannot be corrected with this procedure present a greater challenge – one that Dr. Deland and his colleagues seek to solve with an innovative approach in which they lengthen the bone in the outside of the foot to help restore the arch. “You accomplish this by adding bone,” notes Dr. Deland. “The size of that piece of bone is critical in how well the patient is going to do. If you put in too little, you can undercorrect it. If you put in too much, you can overcorrect it and make the foot too stiff.” Dr. Deland has developed a unique approach using special trial wedges he designed that are inserted in one-millimeter increments until the proper correction is achieved.

The work of the foot and ankle surgeons often takes them into the Leon Root, MD, Motion Analysis Laboratory, directed by Howard J. Hillstrom, PhD.

Fine-Tuning a Diagnosis

Nerve damage is a frequent problem of persons with diabetes, especially with the feet, because it prevents patients from feeling pain and realizing they have injuries. This can lead to painful foot ulcers and even amputation. To measure the nerve reflexes of diabetic patients, Walther H.O. Bohne, MD, (at right) uses a tuning fork test, that has been proven to be a useful and reliable way to diagnose diabetic nerve disease.



If the Shoe Fits...

...you may be able to avoid foot problems. Shoes that are too tight or too high can promote the development of foot and ankle pathologies. Walking in high heels can lead to a contracture of the Achilles tendon,

ankle sprains and breaks, corns, calluses, hammertoes (below), arthritis, and even chronic knee pain. X-ray image is from H. Turvey/Photo Researchers.



Caring for the Foot and Ankle

Conditions of the foot and ankle – from the common bunion to rare and complex joint and tendon disorders – represent a major area of expertise for clinicians at Hospital for Special Surgery.

Diagnosis

Traumatic Injuries



Fracture fixation

Disorders of the Tendon



Tendon repair

Osteochondral Lesions of the Talus



Miniature arthroscopy

Rheumatoid Arthritis



Stephen A. Paget, MD

Overview

Foot and ankle trauma encompass a range of injuries that include fractures of one or more bones, as well as damage to ligaments, tendons, and nerves. The severity of these injuries can range from low-energy trauma, such as twisting a foot by falling off a curb or sliding into second base to higher energy injuries caused by a fall off a scaffold.

Tendons connect muscles to bone, and can tear or rupture if they are pulled too hard or if they degenerate. Inflammation (tendinitis), degeneration (tendonosis) and ruptured tendons are common problems encountered in the foot and ankle. Most cases of tendinitis are caused by injury, overuse, or a mechanical abnormality.

Frequently occurring as a result of trauma or injury to the ankle, osteochondral lesions involve damage to the cartilage of the talus bone located below the ankle joint. Cartilage has a very poor ability to heal itself, and if the bone below it is injured as well, it loses its blood supply. The goal of treatment is to stimulate the bone to heal and maintain the integrity of the cartilage.

Rheumatoid arthritis (RA) is a systemic autoimmune disorder affecting joints in the upper and lower extremities. Nearly all patients with RA develop symptoms in the foot or ankle, generally beginning in the toes and forefeet, followed by problems in the back of the foot, and eventually the ankles. RA affects not only the joints, but also soft tissues such as tendons and ligaments.

Symptoms

According to Dr. David S. Levine, high-impact fractures can result in shattered bones or an open fracture in which the bone protrudes through the skin. A fracture of the foot or ankle can heal in a deformed position causing pain and an inability to bear weight, and could become arthritic after many years. Because gravity causes fluid to pool in the foot, massive swelling after a traumatic injury is common.

Tendon problems can bring chronic and debilitating pain and swelling. Tendinitis may be localized during or following activity. Tendonosis may cause swelling or a hard nodule of tissue on the back of the leg. In posterior tibial tendon insufficiency, the foot can collapse as the ligaments give way. This may cause pain on the inner side of the ankle and into the mid-section of the foot.

According to Dr. Martin J. O'Malley, if the cartilage is damaged, it may slowly deteriorate over time – changing from a smooth frictionless surface to one that is irregular. Generally, patients present with an ankle injury that hasn't healed. Symptoms may be minimal, and can include swelling, bruising, a grating feeling with movement, weakness, or instability of the joint.

In RA, the body's immune system reacts against itself and can cause pain, swelling, and stiffness in the joints, sole, or ball of the foot. The inflammation may cause the joints to feel warm, and because RA is systemic, fatigue and weight loss may also occur. In addition, the foot may become deformed as toes curl and stiffen, and walking can become difficult.

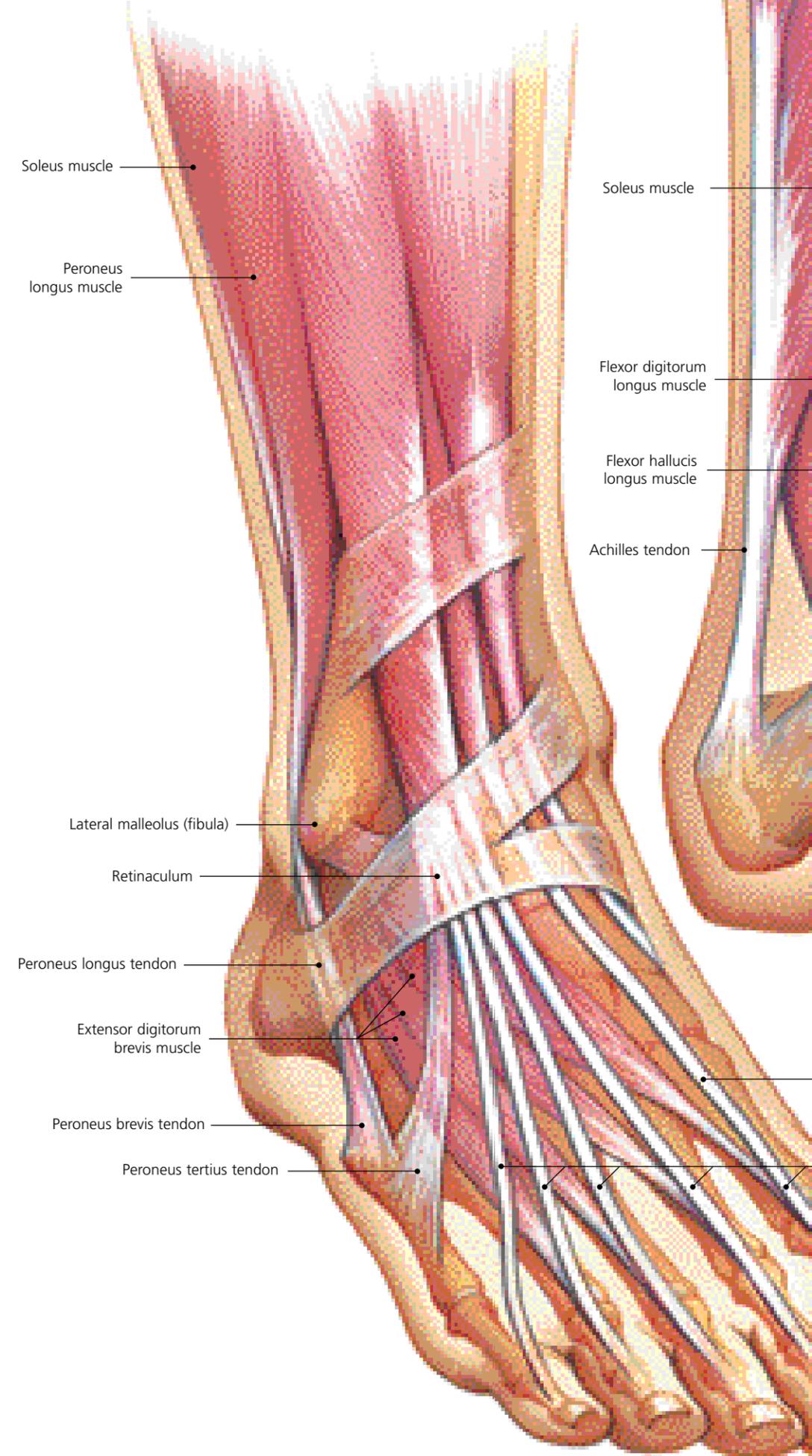
Treatment

Once swelling has diminished, the Hospital's orthopedic surgeons may use fixation devices, including small plates and screws, to hold the bone together and allow it to heal. With the initial use of an external fixator and the appropriate timing of surgery, the need for casting – which can result in a straight but stiff limb – can be eliminated.

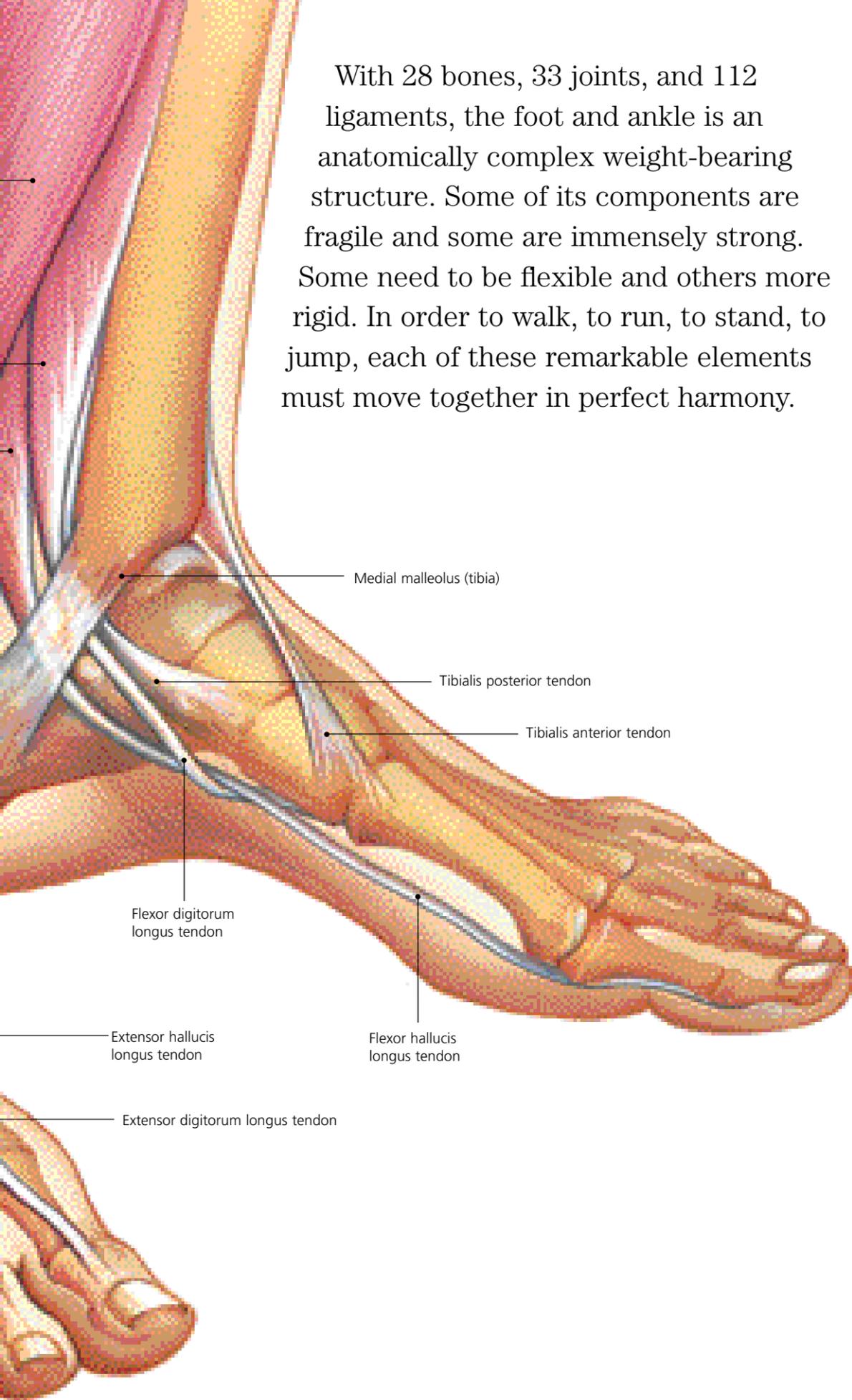
At Special Surgery, depending on the injury, tendon conditions are first treated conservatively with medications and/or orthotics to help relieve symptoms. When surgery is indicated, our surgeons incorporate minimally invasive approaches, whenever possible, to repair the tendon. They may also use radiofrequency to stimulate a healing response in the affected tendon.

The Hospital's foot and ankle specialists are finding innovative ways to treat these injuries through smaller incisions and promote cartilage healing, including stimulating the bone arthroscopically to produce new tissue; transplanting cartilage and bone from another area to implant in the ankle; and retrograde drilling, which involves drilling up to the lesion without disturbing the cartilage.

Rheumatologists under the direction of Dr. Stephen A. Paget, Physician-in-Chief, apply the latest therapies, including biological-response modifiers, to suppress the disease and prevent joint damage and deformities. If RA has already progressed, treatment options include local steroid injections, orthotics, and physical therapy, as well as non-steroidal anti-inflammatory medications.

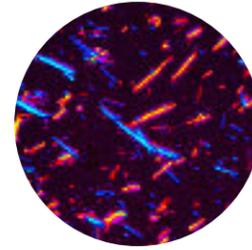


With 28 bones, 33 joints, and 112 ligaments, the foot and ankle is an anatomically complex weight-bearing structure. Some of its components are fragile and some are immensely strong. Some need to be flexible and others more rigid. In order to walk, to run, to stand, to jump, each of these remarkable elements must move together in perfect harmony.



Diagnosis

Crystal Diseases – Gout and Pseudogout



Gout crystals

Overview

Crystal diseases, the most common being gout and pseudogout, can cause extreme and disabling pain in the foot, primarily the big toe and ankle. These conditions are considered autoinflammatory, which means they develop in response to local factors. Gout is caused by crystals formed from uric acid; pseudogout is the result of calcium crystals.

Symptoms

A classic presentation of gout is a person who awakens at night with excruciating pain and tenderness in the toe, with heat and redness, that continue to worsen over the next several hours. The initial symptoms of pseudogout are similar, and the diagnosis is differentiated by examination of the joint fluid. Gout can also appear in the ankle, knee, elbow, and many other joints.

Treatment

Theodore R. Fields, MD, rheumatologist, notes that an acute attack of gout responds well to anti-inflammatory medications, steroid injections, and ice applications. A prevention regimen for gout may include colchicine to inhibit factors contributing to inflammation, and allopurinol to lower uric acid. For pseudogout, colchicine can also help prevent recurrence of attacks.

The Diabetic Foot



Nerve testing

Diabetes is an insidious disease that involves many organ systems. Since most patients lose some sensation in the lower extremities because of nerve damage, they are at risk for injuring the sole of the foot without knowing it. Unattended, minor injuries can lead to infections, deep ulcers, and ultimately bone and joint involvement.

An early sign of the diabetic foot is swelling, sometimes mistaken for an infection, but which is actually bone deterioration near the joints. As the joint crumbles, the arch of the foot reverses and becomes flatter with bony prominences from the fragments that are present on the sole. These can cause skin to break down leading to ulcers.

Patients must be vigilant in monitoring their feet to avoid injuries that can lead to amputation. A patient with unexplained swelling should seek immediate medical attention. Dr. Walther H.O. Bohne combines an in-depth history, physical exam, and imaging studies to determine the appropriate intervention, as well as counsels patients on foot care.

Forefoot Deformities



Hallux valgus (bunion)

Among common forefoot conditions are hallux valgus (bunion) and metatarsalgia. With bunions, the big toe deviates toward the second toe causing a painful prominence at the base of the big toe. Metatarsalgia is a painful condition caused by the compression of a small toe nerve between two displaced metatarsal bones.

Bunions appear as a bulging bump on the inside of the base of the big toe. Common signs include redness, swelling, and intermittent or chronic pain. Pain may also develop in the second toe if the big toe is pushing against or overlapping this toe. The classic symptom of metatarsalgia is pain in the ball of the foot that can be acute, recurrent, or chronic.

Surgery is indicated when there is pain, limitation of function, and progression of deformity. In metatarsalgia, the Hospital's surgeons realign the bones of the toe. With bunions, they perform reconstructive surgery to repair the bone and joint deformities, correct the cause of the bunion, and prevent it from growing back.

Stress Fractures



Linda A. Russell, MD

Stress fractures are minute cracks that can occur in the bones of the foot and lower leg when muscles become fatigued and unable to absorb repeated impacts. They can also occur if osteoporosis or another disease has weakened the bones. The most commonly affected site is the second or third of the long bones between the toes and the midfoot.

Stress fractures generally present as localized dull pain that is not associated with trauma and worsens during exercise or weight-bearing activities. There may be some swelling at the site. Tenderness when touched is a key characteristic. If the activity that caused the stress fracture is resumed too quickly, larger, harder-to-heal fractures can develop.

According to Dr. Linda A. Russell, rheumatologist, if an individual has a stress fracture in their foot, a bone density measurement should be taken to determine if osteoporosis is present. The most important treatment is rest. If osteoporosis is diagnosed, medications are available to help prevent future fractures.

Clubfoot



David M. Scher, MD

Clubfoot is a congenital deformity that occurs in about one in every thousand births in the United States. If a parent had a first degree relative with clubfoot, the incidence increases. "If not corrected, a child can have difficulty with walking, running or normal activities," says Dr. David M. Scher. Clubfoot is frequently diagnosed at 20 weeks gestation through a fetal ultrasound.

Clubfoot affects a child's foot and ankle, twisting the heel and toes inward. The affected foot tends to be smaller than normal, with the toes pointing downward and the forefoot turning inward. The heel cord is also tight, causing the heel to be drawn up to the leg, making it impossible to put the foot flat on the ground. The clubfoot, calf, and leg are smaller and shorter than normal.

The Hospital's orthopedic surgeons are able to treat clubfoot so that the foot can function normally. They correct the foot using the Ponseti technique – a process of weekly manipulations and casting – to stretch the joints, ligaments, and tendons, and remold the bones back into position.



Intricate Terrain

Martin J. O'Malley, MD, must navigate complex bone, cartilage, and soft tissue structures when performing reconstructive surgeries to treat foot and ankle disorders. Dr. O'Malley and his colleagues continually pursue new ways to surgically repair injuries without big incisions and facilitate cartilage healing so patients can return to normal activity as quickly as possible.

The uniquely designed Motion Analysis Lab is one of the largest of its kind in the country and includes a 32-foot-long platform containing force plates that can be arranged for evaluating a range of foot problems and other pathologies. Says Dr. Hillstrom, who designed the facility, “You can bring them close together for small stride lengths for three- or five-year-olds, or place them apart for a seven-foot-tall basketball player.”

The lab also has technologies to discern flexibility in the first metatarsal joint, the height of the arch, and other aspects of foot structure. In one NIH-funded project, Dr. Hillstrom is looking at forefoot geometry and how the curve that is formed by the ball of the foot relates to its function.

The Diabetic Foot

Walther H.O. Bohne, MD, offers specialized expertise in the diabetic foot. “Since most patients with diabetes lose some of the sensation in the lower extremities, they are at risk for injuring the sole of their foot without realizing it,” says Dr. Bohne. “This begins a cascade of events that leads to deeper wounds and infection. These patients can go on to develop an ulcer, which if left untreated, can deepen and involve the bone, putting them at risk for amputation.”

In addition, notes Dr. Bohne, patients with diabetes can develop Charcot’s arthropathy – a complication that involves fragmentation of the small bones in the foot. The condition, however, often goes undiagnosed because patients are unaware of a problem until swelling appears. “The bony prominences from the fragments can cause excessive pressure and break down the skin leading to ulcers. As soon as the diabetic patient sees unexplained swelling in the foot, he or she should seek the immediate attention of a physician who understands and can treat the orthopedic consequences of diabetes.”

According to Dr. Bohne, education is the key in preventing the severe consequences of diabetic foot conditions. And, he cautions, at the very least, a person who has diabetes should never walk barefooted and always wear slippers or shoes with a solid sole to prevent anything from penetrating the skin.

The Right Start

Cerebral palsy is a neurological disorder that results in abnormal muscle tone in children. “This can result in muscle imbalance that causes the foot to deform,” says Leon Root, MD. “Weakness in the muscle in the front of the leg can cause the child to walk on his toes.” In the young child, the

use of braces and therapy may control the way the child walks, but if the child continues to walk abnormally despite conservative treatment, surgery is performed to rebalance the muscles around the foot and ankle in order to obtain normal weight-bearing position of the feet.

Clubfoot is a congenital deformity that causes a child’s foot to be twisted and pointed downward. “If left untreated, the foot would not be amenable to proper walking, running, or normal functions,” says David M. Scher, MD, Director, Clubfoot Clinic. “The beauty of treating a clubfoot is that when attended to in a timely manner – usually the first two weeks of life – we can take advantage of the properties of the immature musculoskeletal system by manipulating the foot to stretch the joints, ligaments, and tendons and actually remold the bones back into a normal position. In two months or less, we’re able to make the foot functionally normal for life.”

Non-Surgical Solutions

“Leonardo DaVinci once said that the foot is the pedestal of the body. Everything starts at the foot and ankle and works its way up,” says Rock Positano, DPM, MSc, MPH, Director of the Joe DiMaggio Non-

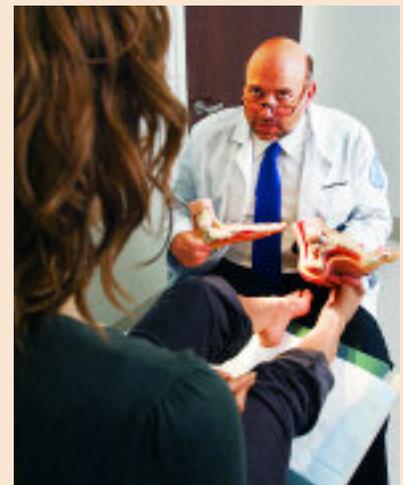
Stride Right

“While foot problems, in and of themselves, are not life threatening, they are lifestyle threatening,” says Rock Positano, DPM, MSc, MPH. “We take for granted how important feet are to everyday living. The ability to work, exercise, and go out are completely dependent upon how our feet function. And, as strange as it may seem, foot problems can affect virtually any part of the body. “For instance, a flat foot or



high-arched foot mechanically changes the way a person’s foot hits the ground and may be helped with an orthotic (at

left),” he says. “If the foot is not able to absorb the shock properly, the joint reaction force is transmitted up to the knee, hip, and back.”



Surgical Foot and Ankle Service – the first of its kind at a major orthopedic teaching hospital.

Heel and Achilles tendon pain, ankle sprains, shin splints, bunions, metatarsal pain, neuroma, and tendon problems are among the many conditions evaluated and treated by Dr. Positano, who is the author of three major textbooks on non-surgical foot treatments. “Most patients who come to our practice have biomechanical issues, and we often prescribe a foot orthoses to achieve better alignment and decrease the amount of force that the foot has to endure.”

“We are able to custom fabricate orthoses to the needs of the patient on site with direct input from our physicians,” says Glenn Garrison, Director of Prosthetics and Orthotics. “This collaboration with the clinician provides for a much better, higher quality of care for the patient.”

Physical therapy also plays a key role. “Therapy is designed to calm down inflammation, diminish swelling, and restore normal motion and mechanics, and improve proprioception of the foot and ankle,” says Todd Gage, PT. “The entire kinetic chain must be evaluated. In order to effectively treat the foot and ankle, you must evaluate the adjacent segments to restore normal mechanics of the entire lower extremity.”

“If physical therapy, foot orthoses, and injections do not produce the desired result,” says Dr. Positano, “then it’s a seamless transition to the next phase of care – our surgical colleagues are right next door.”

An Inflammatory Effect

Problems of the foot and ankle may be the result of an inflammatory or autoimmune disease such as rheumatoid arthritis. “These conditions can cause joint inflammation,” notes Stephen A. Paget, MD, Physician-in-Chief, and Chairman, Division of Rheumatology.

Sergio Schwartzman, MD, specializes in spondyloarthropathies – a group of inflammatory diseases that tends to affect the spine as well as the joints of the lower extremity. When these diseases affect peripheral joints, patients may have inflammation that results in pain and swelling. “These diseases are not always obvious,” says Dr. Schwartzman, a rheumatologist. “It is important to remember that all autoimmune diseases can affect the foot and ankle.”

Picture Perfect

Successful treatment for any foot and ankle disorder depends on the extraordinary imaging capabilities of the Department of Radiology and

Imaging directed by Helene Pavlov, MD, FACR, Radiologist-in-Chief. “An X-ray provides an overview of the boney architecture and alignment and soft tissue anatomy,” she says. “An MRI can further pinpoint a specific abnormality. The imaging is very sensitive and specific, and the detail is exquisite.”

“Ultrasound, which employs high frequency sound waves to produce images, is an excellent method for assessing soft tissue swelling or a small cyst on the foot,” says Ronald Adler, PhD, MD, Chief, Division of Ultrasound and Body CT. “The periarthicular soft tissues can be exquisitely detailed, and the real-time aspect of ultrasound is helpful in that we can display how joints and tendons move through a series of maneuvers.”

Radiologists also use ultrasound for therapeutic procedures, particularly ultrasound-guided injection. “The synovial sheaths that surround the tendons of the ankle, as well as the bursa, can be specifically identified when inflamed, and cortisone injections can be carefully targeted to the site required,” says Dr. Adler. “We are able to see the joint and soft tissues surrounding the abnormality, as well as nerves and arteries, and can avoid those structures when we do the injection under ultrasound guidance.” ■

Forward Thinking

While there are a number of strategies to treat osteochondral injuries, John J. Kennedy, MD, Director of Research in the Foot and Ankle Service, and colleagues in sports medicine, are at the forefront of computerized navigation to identify and treat these lesions. Dr. Kennedy, with Dr. Deland and others, is investigating clinical outcomes of existing treatments and pursuing novel future treatments in the laboratory.



Tending to Tendons

Andrew T. Elliott, MD, one of seven orthopedic surgeons with the Foot and Ankle Service, has an interest in degenerative tendon

disorders. Zarela Martinez (right) came to him when she was unable to walk due to a posterior tibial tendon insufficiency. Dr. Elliott performed reconstructive surgery that enabled her to return to her very active life as a restaurateur.



**Back on Her Feet,
Thanks to
Special Surgery**

Following surgery for a tendon injury, Zarela Martinez is now back at her Eastside Mexican restaurant – Zarela – and greeting guests.

“The worst part about recovery was that I couldn’t cook,” she says. “I had to eat takeout – it was horrifying!”

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Best Foot Forward

Best-selling author Mary Higgins Clark is used to unraveling clues in the plot lines of her 25 suspense novels that have sold more than 85 million copies in the United States alone. But when it came to her health, solving the mystery of an ankle problem proved a lot more daunting.

Nearly two decades ago, Ms. Clark had undergone a triple bone fusion on her ankle. From the very beginning, she says, she knew that "something wasn't right." But she suffered for another five years until a friend recommended that she come to Hospital for Special Surgery and see Jonathan T. Deland, MD, Chief of the Foot and Ankle Service.

At her first visit, Ms. Clark recalls his exact words: "It's elective surgery, but if you don't do it, at some point you will never walk again.' And I said, 'I don't call that elective!'"

Dr. Deland performed revision surgery that included a triple bone fusion to preserve as much as possible her ability to walk. As Ms. Clark says simply, "I know absolutely that he saved my ankle."

With a history of foot problems, she continued to experience a number of issues with both of her feet – coming back each time to Special Surgery for care. "Genetically, I have really rotten arches, and they led to other troubles," says Ms. Clark. "I also broke my leg with damage to the ligaments from, if you can believe this, slipping on the tiniest piece of a banana." Once again, she notes, Dr. Deland "saved my foot."

A native New Yorker, Ms. Clark was raised in the Bronx, and began her working career in an advertising agency before becoming a stewardess with Pan Am Airlines. She started writing short stories following her marriage to Warren Clark. It took six years and 40 rejections before she sold her first piece, *Stowaway*, in 1956 for \$100. After her husband's untimely death in 1964, she went to work writing radio



Mary Higgins Clark

scripts to support her family of five children and began her foray into full-length novels. Some 40 years later, she is still a prolific writer, having just published another holiday suspense novel, *Santa Cruise*, co-authored with her daughter, Carol Higgins Clark, and in April 2007, her 26th novel, *I Heard That Song Before*, will be published by Simon & Schuster.

A contributor to Dr. Deland's research and clinical programs, Ms. Clark has high praise for him and the staff of Special Surgery that enabled her to 'stay on her feet.'

"Dr. Deland is a wonderful, caring surgeon, and certainly the staff is wonderful, too," she says. "I think that in both judgment and skills in the operating room, he is top-drawer...he's marvelous."

According to Ms. Clark and the thousands of patients treated by the Hospital's foot and ankle specialists, there's no mystery of what it takes to provide the highest quality care. ■