



THE UNIVERSITY OF TOLEDO MEDICAL CENTER

# ORTHOPAEDIC MONTHLY

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## Necrotizing Fasciitis

Necrotizing fasciitis, commonly known as a flesh-eating disease, is a limb- and life-threatening soft tissue infection. Necrotizing fasciitis is an infection of the deep layers of skin and subcutaneous tissues which spreads across the fascial plane within the subcutaneous tissue. Early diagnosis and adequate treatment are important to save the limb or the life of the patient.

Type I necrotizing fasciitis describes a polymicrobial infection, while type II describes a monomicrobial infection. There are several types of bacteria which can cause necrotizing fasciitis. Some of the more common bacteria include: group A streptococcus, staphylococcus aureus, clostridium perfringens and vibrio vulnificus. Necrotizing fasciitis usually occurs after a minor trauma and may be associated with chronic disease or illnesses. Necrotizing fasciitis is usually found in alcoholics, diabetics, insect bites or post-surgery infections.

The mortality rate for necrotizing fasciitis is about 33 percent; this is published data. Necrotizing fasciitis is typically under-diagnosed because it often resembles low-grade cellulitis. Surgical debridement should be done urgently. Delay in surgery for more than 24 hours is associated with increased mortality.

To diagnose necrotizing fasciitis, physicians will look for several different components. Pain and tenderness beyond apparent margin of infection is diagnostic and found in 98 percent of cases. Group A strep is common but other polymicrobial infections will start and involve the fascia and the toxins will spread. Other findings in published data include:

- Erythema (100 percent)
- Bullae formation (less than 50 percent)
- Crepitus (approximately 14 percent)



- Skin necrosis (approximately 14 percent)
- Tachycardia (about 75 percent)
- Fever (about 50 percent)
- Low blood pressure – also known as hypotension/septic shock (about 18 percent)

Early diagnosis is essential. Aggressive and extensive debridement of the affected area will be needed. In addition, physicians will probably obtain a biopsy from the periphery and not from the necrotic center. Debridement should be repeated on almost a daily basis. Antibiotics should be given according to the culture and the sensitivity. Hyperbaric oxygen can be used and has been found to be effective for clostridial myonecrosis. There is a high incidence of extremity amputation if the fascia is penetrated by infection.

## UT Orthopaedic Residents Score in the 93rd Percentile on AAOS In-Training

In mid-January, the American Academy of Orthopaedic Surgeons (AAOS) released the in-training examination results for the 2010-2011 academic year. The orthopaedic residents were ranked in the

93rd percentile, continuing the trend of high scores over the past 10 years.

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For the program to achieve this high score, they need to score above the mean in each of the 12 exam categories. This means the program cannot be excellent in some topics and weak in other topics. To achieve a ranking in the 93rd percentile or above, the program must be above the mean in every category for the group, with no resident scoring below the 50th percentile.

The department's educational success lies in its application of a simple system. In the Department of Orthopaedic Surgery, this technique is called the salami technique. Every day, one slice is taken, even if it is only a thin slice; it is one slice more than everyone else. This will definitely make the difference at the end of the preparation period for the in-training exam. For example, the residents' slice is one hour per day for several months. At the end of the period, they will have studied approximately 50 hours more for the exam than the majority of residents in other programs. A little bit every day will

make the difference. Homework or assignments are not given, but a structured approach is utilized in the department. In the UT Department of Orthopaedic Surgery, an objective to finish the review of all 14 topics in a reasonable time (1 hour per day) is set. The residents are asked to get up early and participate in the study sessions.

UT's Orthopaedic Surgery Residency Program is a five-year program fully accredited by the Accreditation Council for Graduate Medical Education (ACGME). In 2007, the program was awarded an increase in resident complement by the ACGME for its quality of education. For the third year in a row, we will be offering four, first-year position for the 2011 residency match. There are currently 17 orthopaedic residents in UT's program.

We wish UT's orthopaedic residents congratulations on a job well done!

## Heel Pain

Heel pain is a common complaint with several common causes. It is essential to correctly diagnose the cause of symptoms so that appropriate treatment can be given to patients.

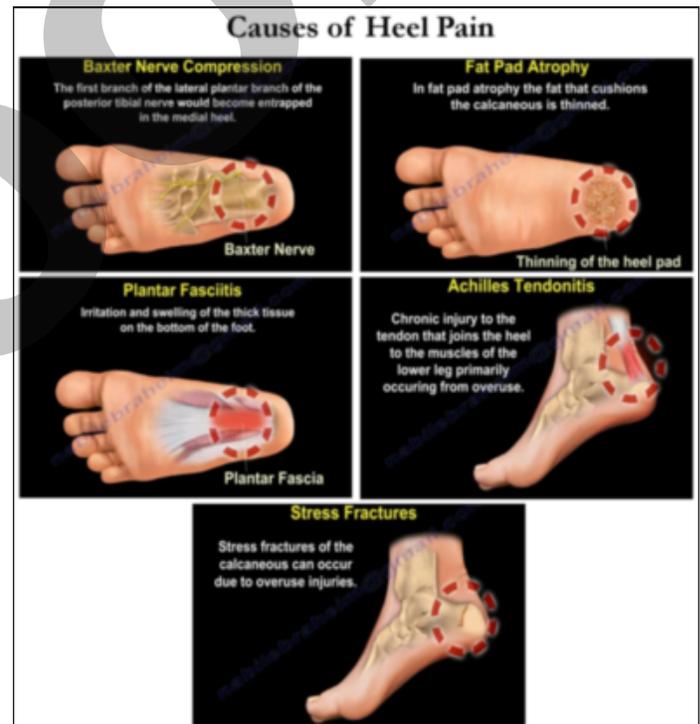
Common causes of heel pain include: baxter nerve compression, plantar fasciitis, fat pad atrophy, achilles tendonitis and stress fractures of the calcaneus.

The Baxter nerve is the first branch of the lateral plantar nerve, which is a division of the posterior tibial nerve. This nerve becomes entrapped in the medial heel. This entrapment results in heel pain, paresthesia, abnormal sensations on the plantar aspect (bottom) of the heel and medial heel tenderness. Sprinters, dancers and gymnasts have well-developed abductor hallucis muscles, which will compress the nerve when they are frequently on their toes. Treatment includes: heel stretching exercises, non-steroidal anti-inflammatory medications, orthotics or surgery. Surgical intervention is used to decompress the nerve at the fascia between the abductor hallucis and quadratus.

Plantar fasciitis is characterized by swelling and irritation of the thick fibrous band on the bottom of the foot. The fascia may become inflamed and painful, making walking more difficult. Plantar fasciitis is usually most severe in the morning when patients first stand on their feet. Stretching exercises or walking often help in relieving painful tightening associated with plantar fasciitis. Painful symptoms will intensify with prolonged exercise, standing, running or increased activity. Patients with plantar fasciitis will also demonstrate medial calcaneal tuberosity tenderness and a tight heel cord. Treatment for plantar fasciitis includes: anti-inflammatory medications, heel cord stretching, shoe inserts (heel padding) and, rarely, surgery.

In the case of fat pad atrophy, the fat cushioning the calcaneus is thinned. This condition is common in elderly people and can cause significant pain while walking. There is also a history of steroid injection in many patients. Treatment for fat pad atrophy includes anti-inflammatory medications and shoe inserts.

Achilles tendonitis is a chronic injury to the tendon that joins the heel to the muscles of the lower leg. It is caused primarily by overuse



and is characterized by pain at the back of the heel. The Achilles tendon provides us the ability to rise up on our toes, allowing for the act of walking. For patients with Achilles tendonitis, walking can become very painful. Treatment includes: anti-inflammatory medications, physical therapy, massage therapy, ice therapy and immobilization.

Stress fractures of the calcaneus occur due to overuse. Patients will experience pain when weight-bearing. Calcaneal stress fractures are typical in running sports due to the repetitive shock being placed on the heel. Side-by-side compression of the calcaneus is usually painful. Treatment includes: rest, partial-to-complete immobilization and activity modification.

# Bursitis of the Knee

The knee bursa is a small, fluid-filled sac located between the front of the knee cap (patella) and the overlying skin. The major bursae are located adjacent to the tendons near the large joints. When the bursa becomes inflamed, the condition is known as bursitis.

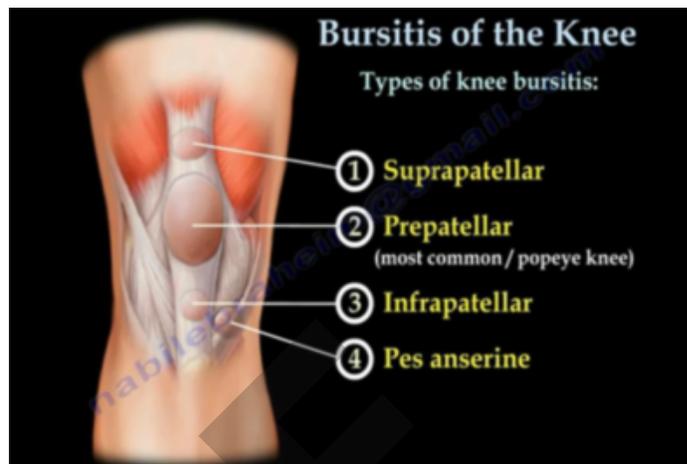
The bursa allows the knee cap to glide smoothly underneath the skin as we bend and straighten the knee. Bursitis refers to inflammation of this bursa located atop the knee cap. Bursitis causes:

- Pain
- Swelling
- Tenderness
- A lump in the area on top of the knee cap

It may become incredibly difficult to kneel down and put the knee on the floor due to pain, tenderness and swelling.

There are four types of knee bursitis: suprapatellar, prepatellar, infrapatellar and pes anserine. Suprapatellar bursitis is located above the patella and is relatively uncommon. Prepatellar bursitis, also known as the popeye knee, is the most common type of knee bursitis. This type of bursitis is located in front of the knee cap. Infrapatellar bursitis is located just below the knee cap beneath the large tendon that attaches the muscles in front of the thigh and the knee cap to the prominent bone in the front of the lower leg. Finally, pes anserine bursitis is located inferior and medial to the knee joint.

Trauma and infection are common causes of knee bursitis. Trauma, such as a direct injury or a fall onto the knee, can damage the bursa with the development of sudden and significant swelling. It can also be occupational in nature due to kneeling. Bursitis, in this situation, is chronic and develops slowly as seen in carpet layers, tilers,



wrestlers, etc. Infection can also cause knee bursitis. Physicians should inspect the bursa for any breaks in the skin which may lead to infection. Bursae that are red, hot, painful or swollen could be infected. Finally, inflammation can cause bursitis.

Treatment of patellar bursitis includes:

- Anti-inflammatory medication
- Antibiotics-if infection is suspected or confirmed
- Ice therapy
- Aspiration-fluid should be sent for culture and crystals
- Surgery including debridement and excision of the bursa

In addition to the above, protective covering should be placed around the knee while avoiding activities that may aggravate the condition during treatment.

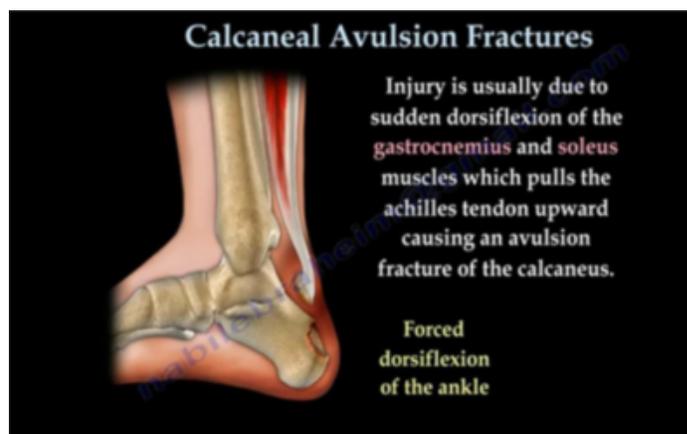
# Calcaneal Avulsion Fractures

The calcaneus is the largest of the tarsal bones. An avulsion fracture of the calcaneus can occur at the point of insertion of the Achilles tendon. Injury is usually caused by sudden dorsiflexion of the gastrocnemius and soleus muscles which pulls the Achilles tendon upward causing an avulsion fracture of the calcaneus. In addition to forced dorsiflexion of the ankle, other causes of avulsion fractures include: falls, sprinting, blunt trauma, diabetes and osteoporosis. Calcaneal avulsion fractures are more common in elderly females.

Published types of calcaneal fractures include: type I, type II and type III.

Type I calcaneal avulsion fractures, also known as the sleeve-type tuberosity fractures, occur when a medium-sized piece of bone is avulsed from the tuberosity. The Achilles tendon pulls this piece of bone up, proximally. The piece of bone causes skin pressure to build which can create skin necrosis and significant soft tissue complications.

Type II calcaneal avulsion fractures, also known as beak-type



fractures, have a larger bone fragment than type I. Fragments may cause skin necrosis and an open wound with exposed bone unless there is urgent treatment for this condition.

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*Calcaneal Avulsion Fractures continued*

Type III calcaneal avulsion fractures are rare. Here, a very small piece of the calcaneus attached to the Achilles tendon avulses. This type of fracture is also known as an infrabursal avulsion fracture.

Most calcaneal fractures are closed injuries that are treated non-operatively or with surgery when the soft tissue conditions improve. Avulsion fractures are rare and they are different. They require urgent care for reduction and fixation of the fragment because the piece of bone is pushing on the precious tenuous skin, which may cause complications/ulcers. This will help eliminate the risk of skin complications and restore the function of the Achilles tendon.

Treatment for calcaneal avulsion fractures includes urgent reduction and screw fixation.

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Neither Dr. Ebraheim nor Dave  
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