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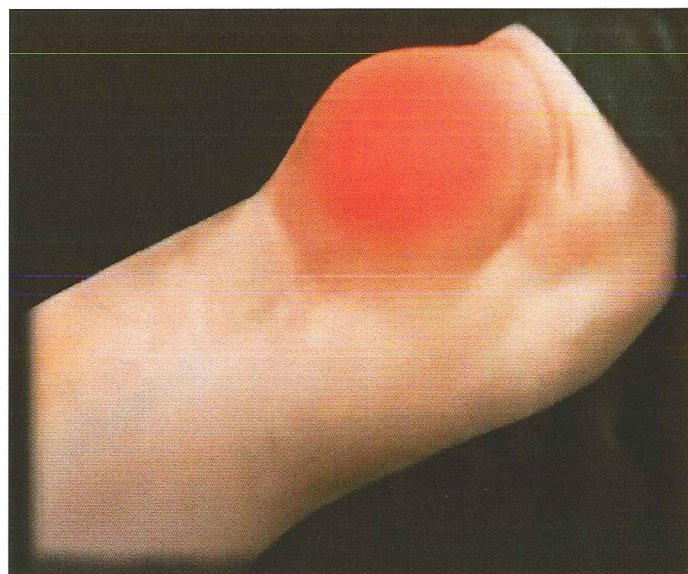
ORTHOPAEDIC MONTHLY

VOLUME 10, ISSUE 10 OCTOBER 2020

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Knee Bursitis

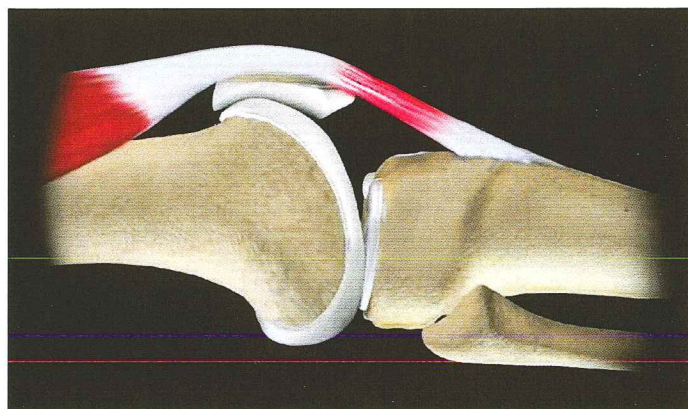
The knee bursa is a small, fluid filled sac located between the front of the patella (knee cap) and the overlying skin. The bursa allows the knee cap to slide freely underneath the skin as we bend and straighten the knee. This is an inflamed bursa over the top of the knee cap. When the bursa becomes inflamed, it is called bursitis, which causes pain, swelling, tenderness and a lump in the area on the top of the knee cap. It may be difficult to kneel down and put the knee onto the floor due to the tenderness and swelling. Types of knee bursitis include suprapatellar, prepatellar (most common), and infrapatellar. Knee bursitis can be caused by trauma such as a direct injury or a fall into the knee which damages the bursa with the development of sudden large swelling. Knee bursitis can also be caused by occupational kneeling. Bursitis is chronic and develops slowly as seen in carpet layers, tilers, and wrestlers. Infection can cause knee bursitis as well. Inspect the bursa for any breaks in the skin leading to infection. Red, hot, painful, and swollen bursa is a sign of possible infection. Wrestlers may have abrasions of the knee, and this can lead to knee bursitis that may be infected. Inflammation of the bursa can also cause knee bursitis. Treatment of knee bursitis includes anti-inflammatory medications, ice therapy, aspiration, or surgery. Do aspiration if infection is suspected or confirmed. Aspirate first before you give antibiotics and send the fluid for



culture and crystals. Surgery is debridement and excision of the bursa may be needed. Protective covering should be placed around the knee while avoiding activities that aggravate the condition.

Patellar Tendonitis Jumper's Knee

The patellar tendon attaches the patella (knee cap) to the top of the tibia. The quadriceps muscle is attached superiorly to the patella. A small part of the quadriceps tendon then continues over the front of the patella to become the patellar tendon. The patellar tendon works with the quadriceps tendon to straighten the leg. Several bursae are seen around the patella: suprapatellar, prepatellar, and infrapatellar. These bursae allow the knee cap to slide freely underneath the skin while bending and straightening the knee. Patellar tendonitis may develop due to repeated stress being placed on the patellar tendon. Patellar tendonitis is often referred to as "jumper's knee". It is an overuse condition that often occurs in athletes who perform repetitive jumping activities. Patellar tendonitis is a knee pain that is associated with focal patellar tendon tenderness, and it is usually activity related. Younger adults will get patellar tendonitis.



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Older adults will get quadriceps tendonitis. Jumper's knee can occur above the patella, below the patella, or at the tendon insertion into the tibia. The most common area for patellar tendonitis (jumper's knee) to occur is just below the knee cap. Patellar tendonitis affects about 20% of jumping athletes. Patellar tendonitis will cause anterior knee pain at the inferior border of the patella with tenderness to palpation at the distal pole of the patella in extension and not in flexion. Patellar tendonitis is a sport specific problem. Examples of sport activities that are typically associated with patellar tendonitis include basketball, volleyball, soccer, and it also may occur in runners. It occurs in younger age athletes, taller body stature, higher body weight, and occurs more in male volleyball players. Predisposing factors include quadriceps inflexibility and atrophy, hamstring tightness, playing on a hard surface, increased training frequency, or patellar hypermobility. Patellar tendonitis occurs due to irritation of the tendon, and it progresses to tearing and degeneration of the tendon. It is degeneration and not inflammation. The condition causes micro tears of the tendon due to repetitive, eccentric forcible contraction of the extensor mechanism with poor flexibility of the hamstrings and quadriceps. Hamstring inflexibility places excessive stress on the extensor mechanism which causes increased forces on the patellar tendon during contraction. We

should focus on screening and treating poor quadriceps and hamstring muscle flexibility to prevent patellar tendonitis in athletes. X-rays will appear normal. MRI and ultrasound will show degenerative changes in the tendon and tendon hypertrophy. Ultrasound with colored doppler may show increased vascularity. Examine the patient for flexibility of the lumbar spine as well as the hamstrings and quadriceps muscles. Stiffness may cause patellar tendonitis. Treatment is rest, anti-inflammatory medications, stretching and strengthening (stretch the hamstrings and the quadriceps and use eccentric exercise program). A patellar tendonitis strap can help relieve knee pain caused by patellar tendonitis. Early stages of patellar tendonitis will respond well to nonoperative treatment. Treatment can also be injections. Do not inject steroids into the tendon, it may rupture the tendon. If you think injection is necessary, inject around the tendon. Surgery is done in severe cases. It is debridement and repair of the tendon. If conservative treatment fails for 6-12 months, then surgical treatment is indicated. When the patient continues to have pain during activity and rest, then conservative treatment won't work. Surgery consists of excision of the degenerated parts of the tendon at the inferior pole of the patella. At 12 months, 90% of the athletes return to pre-injury level of activity.

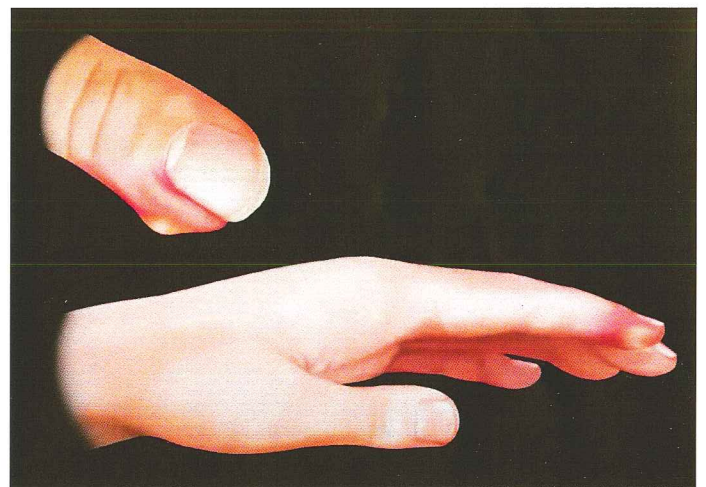
Infections of the Finger

Infection of the finger is common, and it can vary in severity. Serious infection of the fingers will require urgent surgical care.

Felon is a deep infection of the soft pad, or pulp, of the fingertips. It is usually the result of a puncture wound. Swelling or pus is trapped in the small compartments of the pulp or the tip of the finger. Symptoms include unusual redness or swelling, firm swelling, throbbing pain at the tip of the finger, or visible yellowish area of puss. If the infection goes untreated, it may lead to severe symptoms such as skin necrosis, flexor tenosynovitis, osteomyelitis, and arthritis of the distal interphalangeal joint. Surgery is the usual treatment in the form of incision and drainage of the felon. If there is no foreign body in the finger, you will do the midaxial incision or the "J shaped" incision, and you will leave the wound open. If there is a foreign body present, such as a splinter or a thorn, you will do the volar longitudinal incision. Try to avoid doing the "fish mouth" incision; it will lead to unstable finger pulp.

Symptoms of paronychia include swelling, redness, puss formation, and pain in the soft tissue around the nail plate. Treatment is antibiotics if the infection is caught early. Surgery is the usual treatment. Incision and drainage with or without partial nail removal for subungual abscess.

Herpetic Whitlow is a painful infection caused by the herpes simplex virus that usually affects the fingers or the thumb. It is seen in dentists, respiratory therapists, anesthesiologists, and toddlers (children who suck their thumb). Symptoms include swelling, tenderness, redness, fever, swollen lymph nodes, burning pain, and vesicle formation on the finger. It can be grouped together with inflammation and redness at the base of the finger. The fluid in the vesicle is usually clear (not purulent). The infection is self-limiting.



Conservative treatments include antiviral treatments applied to the skin (acyclovir). Antibiotics are not used unless secondary infection is present. Do not do surgery, surgery can make the situation worse.

Flexor tenosynovitis is a relatively common infection of the hand usually caused by *Staphylococcus aureus*. It usually occurs due to prior penetrating trauma and infection. The index, middle, and ring fingers are most commonly affected. Symptoms include painful swelling of the finger that hurts worse with motion. Flexor tenosynovitis has Kanavel's four cardinal signs: uniform swelling of the entire finger (fusiform swelling, finger looks like a sausage), the finger is flexed, intense pain when attempting to straighten the finger (occurs early), tenderness along the course of the tendon sheath (most important sign). If the infection is caught early, treat with IV antibiotics.

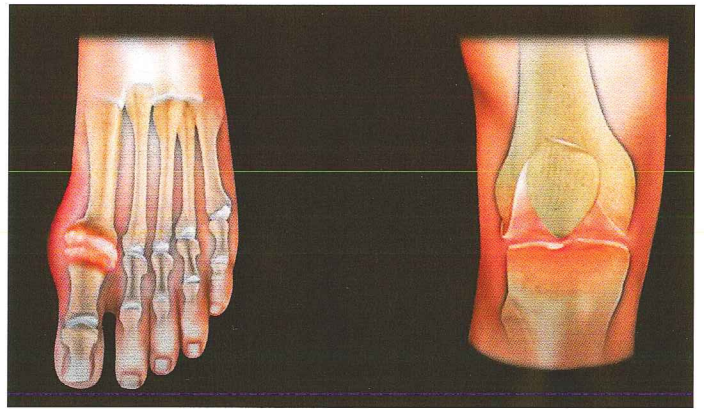
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If the infection is severe, do early open drainage of the infection to avoid skin loss, tendon necrosis, and osteomyelitis. Surgical incisions are used to drain the flexor sheath infection. Use a midaxial or Bruner incision. Use two small incisions, one proximally at A1 pulley and one distally at A5 pulley. Use an angiocath for irrigation. Give culture specific IV antibiotics. Infection may spread from the tendon into the deep palmar space or into the Parona's space in the forearm. The little finger communicates with the ulnar bursa. The

thumb communicates with the radial bursa. The radial and ulnar bursa communicate proximal to the carpal tunnel. Infection may travel from the little finger into the ulnar bursa to the Parona's space. Infection can also travel from the thumb into the radial bursa to the Parona's space. Infection may cause "horse shoe" tenosynovitis. Infection travels from the thumb through the radial bursa to the ulnar bursa infecting the little finger. May need combination of incisions for drainage.

Gout, Pseudogout, and Joint Pain

The most common joint affected by gout is the first metatarsophalangeal joint. The most common joint affected by pseudogout is the knee joint. Gout and pseudogout both show a sudden onset of pain, redness, and swelling typically affecting a single joint in 80% of the cases. Gout and pseudogout are similar problems with different causes. Gout is caused by the buildup of uric acid and the deposit of uric acid crystals inside a joint. The best test to diagnose gout is with a joint fluid analysis. Gout crystals are needle shaped and negatively birefringent. When placed under polarized light, they will be yellow. 90% of patients suffering from gout are men between the ages of 40-60 years old. Gout symptoms and signs include joint pain, swelling and arthritis. Patients with gout have periarticular erosions along with the formation of uric acid soft tissue masses in and around the joint which can be seen on x-ray. Soft tissue tophus deposition with periarticular erosions "punch-out" lesions. The tophus aspirate may look like tooth paste. The sudden attack of gout can be brought on by anything that increases the level of uric acid in the blood such as: dehydration, increased consumption of alcohol, eating large amounts of meat or seafood, or trauma/surgery. Other risk factors for gout are obesity, hypertension, and diuretics. Red meats, seafood, liquor, beer, all increase the risk of gout. Vegetables, wine, dairy products, and total proteins do not increase the risk of gout. Aspiration and analysis of the joint fluid is the best method for diagnosis. Elevated uric acid is not diagnostic. 80% of people with elevated uric acid will not get a gouty attack. There are blood tests such as white blood cell count, C-reactive protein, sedimentation rate, and uric acid level that are helpful in supporting the diagnosis if elevated, but if these levels are normal, it cannot definitively rule out gout or pseudogout. Every time you aspirate a joint and you get synovial fluid, you need to analyze it for cell count differential, find out if you have crystals or not and send the fluid for culture and sensitivity if you suspect infection. It might be difficult to differentiate an acute gouty attack from acute septic arthritis. Patients with an acute gouty arthritis may not have an elevated serum uric acid level. A patient with acute gouty arthritis may present with symptoms and a clinical picture that is similar to septic arthritis. Aspirate the joint fluid, and the joint fluid will look like pus, but it could be gout. The incidence of gout and associated septic arthritis of a joint is low (about 1.5%). The incidence of septic arthritis will increase to 11% or more if the cell count is more than 50,000. We aspirate the joint (aspirate will look cloudy, like pus). We look for crystals and if there is crystals, then it is gout, but the



presence of uric acid crystals does not exclude septic arthritis. We look at the cell count (will be high, 50,000 or more). The neutrophil count may be 80% or more (we think there is an infection in addition to gout or maybe gout alone). We need to culture the fluid. After we aspirate the fluid and send the fluid for culture, then we give the patient empiric intravenous antibiotics pending the culture result. Remember that gout and septic arthritis can occur together, but the incidence is low. The incidence will increase significantly if the cell count is more than 50,000. Pseudogout or chondrocalcinosis is the deposition of calcium pyrophosphate dihydrate crystals in the hyaline cartilage or fibrocartilage (CPPD). Pseudogout is a metabolic disease where calcium pyrophosphate dehydrate crystals (CPPD) are formed within the joint space. Pseudogout most often affects the knee, occurs more in older patients, and is a calcification of fibrocartilage (chondrocalcinosis). Pseudogout crystals are rhomboid shaped and positively birefringent. Crystals will be blue when placed under polarized light. Associated conditions include hyperparathyroidism, rheumatoid arthritis, and gout. Aspirate to see if it is pseudogout or infection, because you do not want to inject the knee with steroids when there is an infection. You need to look for the rhomboid crystals of pseudogout. X-rays in pseudogout will show thin calcification in the articular cartilage or menisci. Calcifications of the synovium, tendon, and ligaments can also occur. Acute gout can be treated with indomethacin or colchicine if the patient cannot tolerate NSAIDs. Colchicine inhibits the inflammatory mediators and is indicated if the patient cannot tolerate indomethacin. Chronic gout can be treated with allopurinol to prevent buildup of uric acid. Allopurinol is a xanthine oxidase inhibitor. Pseudogout is treated with NSAIDs and intraarticular injections.

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Arthritis of the Knee

Osteoarthritis of the knee is the most common cause of arthritis of the knee. The patient will complain of pain, swelling, stiffness, and decreased range of motion of the knee. In arthritis, the cartilage of the knee gets worn off. The meniscus which absorbs the shock, becomes degenerated and tears. With time, there will be more and more degeneration, and the joint space will narrow. When the cushion of the cartilage is completely lost, the bone will rub against bone, causing severe symptoms to the patient with severe pain, inability to walk, a lot of swelling with the knee, and “giving way” (knee will be unstable). The x-ray will show arthritis. When you ask the patient to stand or walk, the alignment of the lower extremity is lost, and the patient may have varus or valgus malalignment. Arthritis can be mild, moderate, or severe. For mild osteoarthritis of the knee, the patient will have some discomfort, and the x-rays can appear normal. The fabric of the articular cartilage breaks down. This can be controlled by nonsteroidal anti-inflammatory medication, weight loss and therapy. For moderate osteoarthritis, there will be narrowing of the joint space on x-ray due to degeneration of the cartilage. There will be cysts in the subchondral space located underneath the cartilage, and there may be some osteophytes or bony spurs. The joint will no longer be smooth (joint surface is roughened with cracks and fissures). The patient’s pain will be worse with more swelling. Treatment can include nonsteroidal anti-inflammatory medications, weight loss and exercise, steroid injections, or platelets and stem cells. For severe osteoarthritis, the condition of the knee is bad. The joint space is severely narrowed with total destruction of the cartilage. The knee is swollen and painful with more osteophytes, and the bone is rubbing against the bone, and no cartilage is left. There is no cushion and nothing to absorb the shock of the weight, so the condition becomes very painful. Because the patient is walking on their own bone, there will be decreased activity, and the patient will have an inferior quality of life. Surgery is the best option for the patient and surgery is usually done by a total knee replacement.

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ORTHOPAEDIC MONTHLY

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