KNEE PAIN

The knee is composed of all the structures that make up or cross the knee joint. The bony structures include the distal head of the femur, the proximal heads of the tibia and fibula, and the patella. The femur and tibia are attached to one another by way of the medial and lateral collateral ligaments and interiorly by the anterior and posterior cruciate ligaments from the femur to their tibial semi lunar cartilage insertions. The knee joint is crossed anteriorly by the patellar tendon (which encases the patella) and posteriorly by the gracilis, hamstrings, gastrocnemius tendons, and popliteal muscle. It is crossed medially by the tendon of the sartorius muscle and laterally by the iliotibial band (the tensor fasciae latae insertion). Other structures that cross the knee are the popliteal and anterior tibial arteries, the great and small saphenous veins, lymphatic structures, and the tibial and common peroneal nerves.

Knee pain may be caused by a torn ligament, a displaced or torn knee cartilage, an effusion (swelling) into the knee, abscess, or disease processes that cause pain or swelling in or around the knee joint. Ligament tears and knee cartilage tearing or displacement may result from trauma to the knee, including external blunt force to the joint or surrounding tissue, or a shearing-twisting force into the knee joint. In the latter case, it generally occurs when the femur is forcibly rotated on the tibial plateau while the tibia is fixed in place, usually occurring during the stance phase of ambulation.

Effusions into the knee joint may also cause *knee pain* from bleeding or an inflammatory process, abscess formation (accompanied by redness, fever and swelling of lymph nodes), or other disease processes of the joint, including chondromalacia. Pain may be referred into the knee joint from nerve root impingement, interspinous ligamentous strain, or from trigger point formations.

Sports related knee injuries are common. The most frequent injury occurring during stance phase when the extended knee is struck from a lateral direction with sufficient force to tear the anterior cruciate ligament or its semi lunar cartilage (meniscus) attachment. Coincidental damage may simultaneously occur to the medial capsule, medial collateral ligament, posteromedial capsule, and even the posterior cruciate ligament. This injury is most common in soccer or American football.

A DSR survey should be made to establish the presence of inflammation and chronic trigger points. An anterior knee capsulitis may only demonstrate the characteristic high skin resistance pattern with the knee flexed to 90^{o}. It won't appear if the knee is straight (extended to 180^{o}.

Treatment

The course of treatment will depend on which treatable causes have been identified (the following is a "general" suggestion).

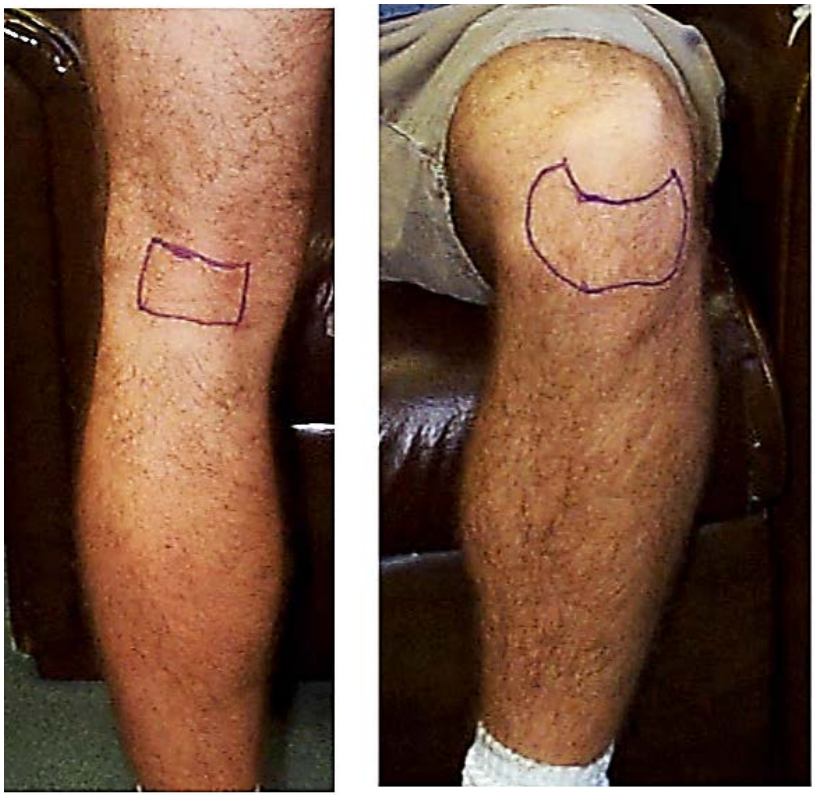
Application:

- Place a negative electrode over the inflamed zone and a positive electrode over a more proximal site. Preset an electrical stimulation unit to deliver a visible contraction, at 7 Hz. Stimulate for 10 minutes.

- Then set the unit to deliver a medium frequency current, with a duty cycle of 10-seconds on and 10-seconds off, sufficient to produce a near tetanic contraction of the involved muscles. Stimulate for 10 minutes.

- Manipulate the tissues in and around the inflamed zone to eliminate any adhesions that are present.

- Preset the ultrasound unit to deliver a 1 MHz pulsed waveform, at 1.8 W/cm^2. Ultrasound the inflamed zone, utilizing an effective non-steroidal anti-inflammatory as a coupling agent, for six minutes.



Anterior and posterior patterns of high skin resistance associated with arthritis of the knee joint (the anterior capsule, knee flexed to 90°; the posterior capsule, knee fully extended)

Trigger Points

The following trigger point formations may, singly or in combination, refer pain into the area of the knee: Gluteus minimus, Adductor longus, Biceps femoris, Vastus medialis, Gastrocnemius, and Anterior tibialis.