

## ARTHRITIC KNEE (CAPSULITIS) SYNDROME

The knee joint is a very unstable joint. It is held together by two major “hinging” ligaments (the anterior and posterior cruciate) and by two lateral supporting ligaments (the medial collateral and lateral collateral). Some anterior structural support is provided by distal sartorius tendon, the patellar tendons (medial and distal) and the patella itself. Posteriorly, some structural support comes from the distal hamstring, hip adductor, popliteus, and proximal gastrocnemius tendons. The femur and the tibia articulate with one another to form the joint. Basically, the femur has two condyles that rest in two grooves carved into the “flat” top of the tibia, when the body is standing. Essentially, extension power of the knee is provided by the quadriceps muscle group and the popliteus (the last 5° of extension, with the foot planted). Flexion power is, for the most part, provided by the hamstring muscle group and the gastrocnemius.

The knee joint itself is encompassed by a capsule. The capsule is a fibrous sack designed to contain joint fluid that “lubricates” the joint and provides a liquid cushion or shock absorber between the distal head of the femur and the proximal head of the tibia. If the joint is traumatized, the capsule may become inflamed, essentially becoming an

“arthritic joint”. The trauma may come from forced extension or flexion, excessive approximating pressure (as from obesity), or a damaging force directed into the joint itself (as in “falling on the knee” or tearing of the cruciate anchoring cartilage from lateral shearing forces).

Regardless of the cause, when the capsule becomes inflamed the body responds nonspecifically to the reactionary inflammatory chemical (specifically the prostaglandins) by trying to “cope” with the joint irritation by “flooding” the joint with calcium, trying to “buffer” the joint. The calcium is laid down in an even manner, but the action of the femur condyles as they “grind” into the grooves on the tibia, forces the loosely bonded calcium to collect in the center of the tibial joint surface between the grooves forming two calcium deposit “spikes” (readily seen on X-ray). Essentially, the patient is forced to “walk” on these spikes, causing more irritation and further inflammatory chemical production.

If untreated, or unsuccessfully treated, the inflammation process may challenge the integrity of the joint, resulting in a distortion of the bony contours and eventually destroying the joint itself.



**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)**

A DSR survey can be used to demonstrate capsulitis (arthritis) of the knee joint. An anterior knee capsulitis will only demonstrate the characteristic high skin resistance pattern with the knee flexed to 90°. I won't appear if the knee is straight (extended to 180°).

### **Treatment**

The course of treatment should be directed at decreasing the inflammation and dissolving the points off the "spikes" (calcium deposits) within the knee capsule.

### **Application:**

- Preset an ultrasound unit to deliver a 1 MHz pulsed waveform, with a pulse frequency of 50%, at 2.0 W/cm<sup>2</sup>. Ultrasound each of the inflamed zones, utilizing an effective non-steroidal anti-inflammatory as a coupling agent, for 6 minutes each site. The anterior capsule should be ultrasounded with the knee flexed to 90°. The posterior capsule should be ultrasounded with the knee in nearly full extension. Please note that as the buffering effects afforded by the bone spurs or extra calcification disappears (as calcific dissolution occurs) the patient may begin to experience an "aching pain". This pain comes from the sound bouncing off the now unprotected periosteum of the bone. Simply reduce the sound amplitude to 1.8 W/cm<sup>2</sup> or drop the pulse frequency to 20%, to make the treatment more comfortable for the patient.
- Manipulate the tissues in and around the inflamed zones to eliminate any adhesions that are present. Be sure to mobilize the patella.
- Ten minutes after the first ultrasound application, ultrasound each of the inflamed zones again, as previously.
- Manipulate the tissues in and around the inflamed zones to eliminate any adhesions that are present. Be sure to mobilize the patella.

- Cold laser each of the inflamed zones for 5 minutes. This is performed to denature or destroy **all** the remaining inflammatories.
- Apply mechanical vibration, delivered at 60 to 120 Hz, utilizing a foot vibrator (if possible), for 2 minutes. The patient should have the shoes on. Apply the vibration at a relatively high but tolerably comfortable level for the patient. This is performed to increase capillary circulation in the involved tissues.

### **Post Treatment Suggestions:**

Suggest that the patient should try to "favor" the involved knee by avoiding hill climbing or stair climbing. If hills and stairs are unavoidable, the patient should keep the involved knee straight when going up or down the stairs. In other words, when dealing with stairs, the patient should go up with the "good" foot first and then bring the "bad" foot up to join it on the stair (taking one stair at a time). When going down, the patient should step down with the "bad" foot first and then bring the "good" foot down to join it on the step (once again, taking one stair at a time). This allows the femur and tibia to simply approximate as the body weight is put on it and avoids the "grinding" action that putting weight on a flexed joint and asking it to extend affords.

### **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.

