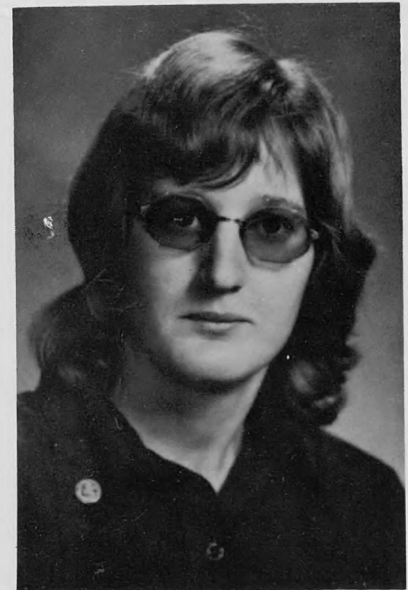


CASE STUDY:

A MEDIAL MENISECTOMY IN WOMEN'S FIELD HOCKEY

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The simple meniscectomy is a commonly performed procedure and generally guarantees the athlete, who undergoes proper rehabilitation, a return to full activity within four to eight weeks. According to O'Donoghue (3), in acute cases it is difficult to diagnose a torn meniscus unless the joint actually locks. In chronic cases where the joint does not actually lock, yet shows recurrent pain and effusion, a tear of one of the menisci must be suspected without a definite history of locking or "giving way." The latter situation was illustrated in the case of a 19 year old center forward on the University of Virginia women's intercollegiate field hockey team.

History

The athlete could recall no specific traumatic incident concerning her right knee except for being struck in the anteriomedial aspect of the joint by a field hockey ball in a game on natural turf in October, 1974. In all probability there was no relationship between her recollection of this incident and the actual initial trauma to her knee. Tears of the menisci result

from torsion or rotational-type injuries or accompany a direct blow that is forceful enough to cause a sprain to one of the collateral ligaments. (2) Thus, it is unlikely that a simple incident such as being struck with a field hockey ball could result in a torn meniscus, but it must be kept in mind that perhaps the pain from that contusion masked a torsion-type injury that occurred at that moment or at some other point in time. While an accurate history is of great value in diagnosing any injury, the lack of a patient's recollection of a specific traumatic incident certainly does not rule out the possibility of any type of injury if its symptoms are present.

Although she finished the game, the athlete experienced effusion, localized tenderness on the anteriomedial aspect of the joint, and discoloration. There was no loss of range of motion and no joint instability at this time, but soon afterwards the athlete began to experience an occasional clicking sensation in her knee. Clicking can be attributed to several sources: movement of the patella over the femoral condyles, the snapping of a hamstring tendon over the bone,

osteoarthritis, or meniscus damage (4). In this case the athlete had no previous history of arthritis, of patellar chondromalacia, or of hamstring tendon problems, and all three were later ruled out upon examination by University of Virginia team physician Dr. Frank McCue. She was initially treated with ice, compression, and elevation and later with hydrotherapy, hydrocollator heat packs, and a compression bandage for activity. Although she missed only one practice, she was placed on a program of isometric and progressive resistance exercises to strengthen her lower extremities. After the season's end the symptoms disappeared, and the joint was asymptomatic while the athlete was relatively inactive until summer, 1975. After playing tennis daily during the summer, the same symptoms of effusion, clicking, and pain, now localized along the medial joint line, began to develop.

Diagnosis

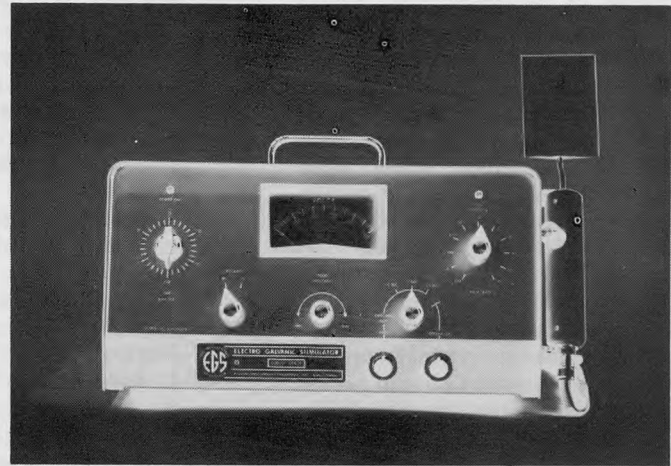
The symptoms, which had been mild to moderate in severity through pre-season field hockey practices in

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September, intensified after the second game of the season. Although the athlete could still perform to a degree, she began to develop pain on lateral motion, pain when walking up stairs, and occasional incidents of weakness or "giving way." Although no audible or palpable clicking could be elicited with a McMurray Test, the athlete's disability was increasing and she was now occasionally experiencing slight difficulty in achieving full extension. There were no signs of ligament instability, patellar chondromalacia, discoloration, or a decrease in the range of motion of the knee. An arthrogram was performed October 6, 1975 at the University of Virginia Medical Center. The arthrogram, an injection of air or a contrast medium into the joint space followed by radiological examination, is quite successful in detecting major lesions of a menisci. However, minor tears or small erosions of the knee's cartilages are difficult to detect using arthrography (5). In this case the arthrogram's results were negative. But with the athlete unable to perform in a satisfactory manner, team physician Dr. Frank McCue recommended surgery to determine the

exact nature of the internal derangement of the knee and to correct it. Two weeks prior to surgery the athlete began doing a series of three exercises to improve muscle tone and to prevent atrophy in the quadriceps muscle group: 1) straight leg raising: raise leg to right angle, hold, and lower slowly — for two minutes each hour, 2) leg raising with the ankle of the uninjured leg across the shin of the injured leg to add resistance: raise legs, hold, lower slowly — for two minutes each hour, and 3) quad setting: tighten the thigh muscle to bring the patella toward the pelvis, hold for six seconds, relax — repeat until the leg gets tired or for one minute each hour.

Surgical Technique

Surgery was performed by team orthopedic surgeon Dr. Frank McCue at the University of Virginia Medical Center October 28, 1975. After a medial incision was made, the knee was flexed, and the medial meniscus examined and excised. The meniscus was not found to be torn within itself, as in a bucket-handle or a horizontal tear, but to be torn away from its soft tissue attachment to the deep portion

of the medial collateral ligament. The lateral edge was frayed rather than actually torn, and the meniscus had been slipping into the joint space causing the slight locking sensation that she had been experiencing. The anterior and posterior attachments were stretched, but they were not actually torn loose. Of particular significance is the fact that a defect in the tibial articular cartilage approximately the size of a quarter had developed from the abnormal amount of movement of the medial meniscus back and forth upon the articular cartilage. This is an important factor in that degenerative changes in a joint's articular cartilage can and do occur. When one debates postponing surgery on a joint that has locked, or one that simply shows evidence in internal derangement as in this case, these factors must be considered. This particular case is an excellent example of how moderately disabling conditions can produce degenerative changes that may lead to degenerative arthritis in later life. In many cases minimization of such degeneration can be accomplished by early surgical intervention.

Also while in surgery, the underside of the patella was examined

and, although it was slightly soft in places, it was not rough and required no surgical correction. The anterior cruciate ligament was also examined and found to be intact. The wound was sutured, and a soft dressing and an elastic bandage from toes to mid-thigh was applied. The patient was released from the hospital after recovery from the general anesthetic - approximately five hours after surgery. For pain she was given morphine in the recovery room and a prescription for demerol. She was also given instructions to begin performing her same pre-operative exercises for five minutes every hour.

She was placed on crutches for one week but was allowed to begin partial weight-bearing after the third day (which was when she could successfully complete ten straight leg raises without having to rest). After the first week she was allowed to use just one crutch, and after ten days when she could walk without a limp, no crutches were used.

Rehabilitation

After the sutures were removed ten days post-surgery, she began receiving daily whirlpool treatments and began the active rehabilitation program used at the University of Virginia, designed by head athletic trainer and physical therapist Joe Gieck (1):

A. Daily Activities

1. Whirlpool treatment

- a. work on increasing the knee's range of motion while in the water
- b. 104°F, 15-20 minutes

2. Isometric Exercises

- a. place right ankle across the left shin, push down with right leg while pushing up with left leg; do this in three positions, with the legs completely straight, slightly bent, and bent at a 90° angle; hold for six seconds, relax, repeat for two minutes.
- b. reverse the procedure above and place left ankle across right shin
- c. knee press: Stand with the feet shoulder's width apart, flex the knees slightly, and place the hands on the lateral aspect of the knee joint. Press out against the hands with the knees for six seconds. Repeat with the hands on the medial aspect of the knee joint and pressing in with the knees. Do each exercise three times.

3. Bench steps

- a. begin by using a regular stair step and advance to using a bench 18-20 inches in height
- b. begin with 1½ minutes and work up to five minutes at a rate of 30 steps per minute
- c. running stairs for three minutes at a rate of 120 stairs per minute can be substituted

4. Flexibility exercises

- a. a variety may be done, but the quadriceps, hamstrings, and gastrocs are the most important muscle groups to work on:
 1. hurdle stretch
 2. achilles tendon stretch
 3. anterior thigh stretch

B. Monday, Wednesday, and Friday Activities

1. Running

- a. begin with stage one - walking two miles, as soon as possible advance to stage two - jogging a mile, and finally advance to stage three - running sprints: 40's, 100's, 300's
- b. rope skipping for five minutes

2. Weight training: knee flexion and extension

- a. determine the maximum weight that can be lifted ten times - as soon as it can be lifted more than ten times, increase the weight
- b. lift 50% of the maximum weight ten times (10 RM)
- c. lift 75% of the maximum weight ten times (10 RM)
- d. lift 100% of the maximum weight ten times (10 RM)
- e. lift, hold for two seconds, lower, rest two seconds, repeat

C. Tuesday, Thursday, and Saturday Activities

1. Running

- a. begin with stage one - walking stairs for 3-5 minutes, as soon as possible advance to stage two - jogging stairs for 3-5 minutes, and finally advance to running stairs for five minutes
- b. rope skipping for five minutes

2. Weight training

- a. leg press on the Universal Gym: three sets of ten repetitions
- b. knee flexion and extension: one set of 200 repetitions in each direction with five to ten pounds

Heavy weights with a low number of repetitions are used to increase strength, and light weights with a high number of repetitions serve to increase endurance. The goals of knee rehabilitation are strength, endurance, and a range of motion that is complete and free of pain. The process is complete when the athlete achieves equal pre-injury levels of strength and endurance in both legs.

In the case of the University of Virginia field hockey player, she began her rehabilitation program November 7, 1975. Initially, she could lift only five pounds with her injured right leg, but she quickly advanced and was up to 15 pounds after two weeks. After four weeks she was lifting 30 pounds with her quadriceps and 20 pounds with her hamstring muscles. She was able to play tennis on Thanksgiving Day, thirty days after surgery. To add variety to her activities, the athlete frequently substituted swimming and bicycle riding for the running portion of the program. By mid-December she was lifting 40-50 pounds with her quadriceps and 25-30 pounds with her hamstring muscles. She was able to play tennis daily over Christmas vacation without incident, and her prognosis for continued improvement and for a return to the sport of field hockey in the fall of 1976 is excellent.●

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