



Main Line Health[®]

Orthopaedics & Spine

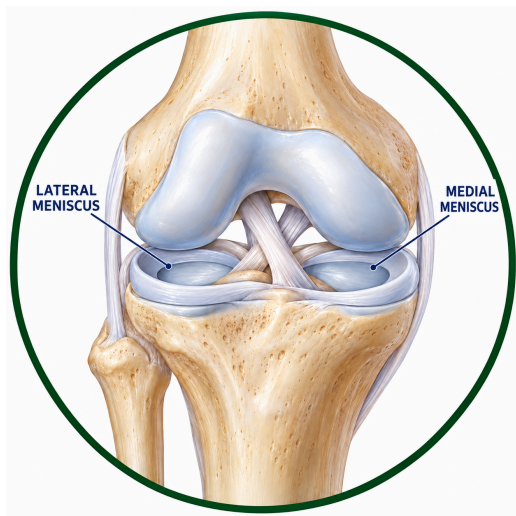
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MENISCAL REPAIR

Understanding the Injury

The knee contains two C-shaped cartilage cushions called the menisci – the medial meniscus and the lateral meniscus – that sit between the femur (thighbone) and tibia (shinbone). They absorb shock, distribute load evenly across the joint, and add stability to the knee.

The outer third of each meniscus has a blood supply (the "red zone") and can often be repaired; the inner two-thirds (the "red-white zone" and "white zone") has little to no blood supply, heals poorly, and usually cannot be repaired.



Meniscal tears occur two ways: a sudden twisting or pivoting injury, often during sports, in younger patients with otherwise healthy cartilage; or a degenerative tear that develops gradually with age and wear, sometimes with little or no specific injury.

Common symptoms include joint-line pain, swelling, catching or locking of the knee, and a sense of the knee giving way.

Diagnosis of a Meniscal Tear

Diagnosis is made through a combination of your history, physical examination (joint-line tenderness, McMurray and Apley tests), and MRI to confirm the tear and characterize its

location and pattern. Your surgeon will review all findings before recommending a treatment plan.

Do You Need Surgery?

Not all meniscal tears require surgery. Small, stable tears — especially degenerative tears in older, less active patients — often improve with physical therapy, activity modification, and anti-inflammatory measures.

Tears that cause mechanical symptoms such as locking or catching, tears in younger or more active patients, and tears located in a repairable zone are generally better candidates for surgery.

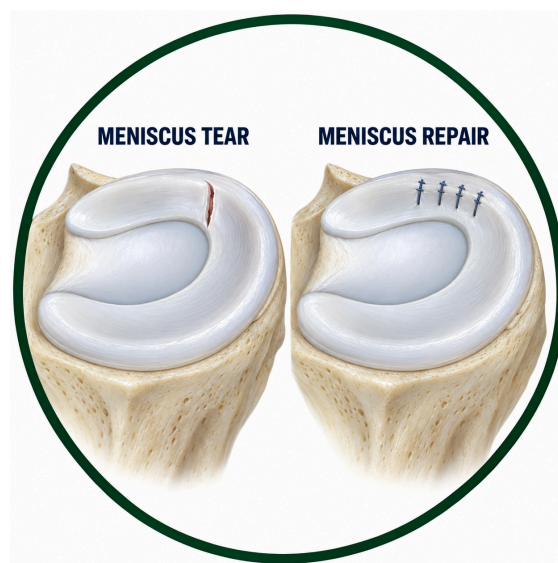
Meniscal Repair Surgery

Meniscal repair is performed arthroscopically through small incisions using a camera and specialized instruments. The torn edges of the meniscus are freshened and repaired with sutures or all-inside repair devices that anchor the tissue back in place, preserving as much meniscal tissue as possible.

Preserving the meniscus, rather than removing the torn portion (a partial meniscectomy), better protects the knee from early arthritis over the long term, which is why repair is favored whenever the tear pattern and location allow it.

Because meniscal tissue heals more slowly than bone, weight bearing and knee motion are deliberately restricted after surgery — more so than after many other knee procedures — to protect the repair while it heals.

Expected Outcomes and Surgical Risks



Benefits of meniscal repair include preservation of meniscal tissue, a lower long-term risk of early arthritis compared with meniscectomy, and restoration of normal knee shock absorption and stability.

Potential risks and complications include:

- Re-tear or failure of the repair, requiring further treatment: approximately 10–20%, depending on tear pattern and location
- Stiffness or loss of motion
- Persistent swelling
- Wound infection, blood clot, or nerve injury: each less than 1%

Most patients regain full knee function when the protective rehabilitation protocol below is followed closely, since the repair's success depends heavily on protecting it while it heals.

PRE-OPERATIVE INSTRUCTIONS

Surgery Preparation Guide

Your preparation before surgery plays an important role in a smooth procedure and recovery. Please review the timeline below carefully.

Several Weeks Before Surgery

(As directed by Dr. Fliegel and the surgical team)

- Attend your pre-operative visit for a full history, physical examination, and surgical counseling.
- Begin gentle range-of-motion and quadriceps activation exercises as directed, to optimize knee function before surgery.
- Establish care with a physical therapist before surgery if possible.

Arrange your home: confirm your knee brace, crutches, ice supply, and a shower stool are in place before surgery.

Several Days Before Surgery

- Wash the knee and leg with Hibiclens (chlorhexidine) surgical soap twice daily for 3 days before surgery.
- Avoid cuts, scrapes, sunburn, or any skin irritation near the knee. Do not shave the surgical area.

The Day Before Surgery

- Confirm your hospital arrival time with our office.
- Arrange for a responsible adult to drive you home and stay with you for the first 24 hours.

The Day of Surgery

- Bring any MRI, CT, or X-ray studies performed outside our system.
- Bring your knee brace and crutches if previously provided.
- Bring insurance cards, photo identification, a list of your current medications, and loose-fitting shorts that will fit over a knee brace.

MENISCAL REPAIR REHABILITATION PROTOCOL

This protocol is a guideline for both patients and physical therapists. Progression from one phase to the next is determined by meeting criteria, not calendar time alone. Please provide your physical therapist with a copy of this protocol.

The primary goals are to:

Protect the repair while it heals

Control pain and swelling

Restore full knee extension and progressive flexion

Restore quadriceps control and leg strength

Safely return to work, recreational, and sport activity

PHASE I: MAXIMUM PROTECTION (0–4 Weeks)

Goals

- Patient education and pain control
- Protect the meniscal repair
- Restore full passive knee extension
- Eliminate swelling (effusion)
- Restore quadriceps and leg control

Immobilization

- Brace locked in full extension for all weight-bearing activities, as directed by Dr. Fliegel
- Protected weight bearing as directed based on the repair performed, progressing to weight bearing as tolerated
- Do not flex the knee past 90°

Range of Motion (Protected)

- Knee extension on a bolster and prone hangs
- Heel props and supine wall slides
- Heel slides and knee flexion off the edge of the table, limited to 90°
- Use caution with heel slides after a posterior meniscus repair

Exercises

- Quadriceps sets and straight leg raises
- Ankle pumps; 4-way leg lifts in standing with brace on
- Abdominal isometrics and non-impact cardiovascular exercise

Advancement Criteria

- Pain-free gait without crutches
- No effusion (swelling)
- Good quadriceps control with full active extension

PHASE II: EARLY MOTION AND STRENGTHENING (4–8 Weeks)

Goals

- Protect the repair while gradually increasing motion
- Normalize gait
- Restore single-leg standing control
- Good control and no pain with functional movements (step up/down, squat, partial lunge) between 0° and 60° of flexion

Immobilization

- Discontinue brace when directed by Dr. Fliegel, generally once quadriceps control and a pain-free gait are demonstrated

Range of Motion

- Gradually progress knee flexion beyond 90° as directed
- No forced passive flexion
- Stationary bike once adequate motion allows

Strengthening

- Closed-chain strengthening between 0° and 60° of flexion only: mini squats, wall slides, squat to chair
- Standing hamstring curl and hip/core strengthening
- Non-impact balance and proprioceptive drills; gait drills
- Non-impact endurance training: stationary bike, elliptical, or swimming

Precautions

- No weight-bearing activity that pushes the knee past 60° of flexion
- Avoid post-activity swelling and all impact activities

Advancement Criteria

- Normal gait on all surfaces
- Functional movements performed without pain or unloading the operated leg
- Single-leg balance greater than 15 seconds

PHASE III: PROGRESSIVE STRENGTHENING (8–12 Weeks)

Goals

- Regain full range of motion
- Continue progressive strengthening and neuromuscular control

- Good control and no pain with functional movements through a fuller range

Range of Motion

- Continue to progress toward full, symmetric range of motion
- Discontinue brace, if not already, per surgeon direction

Strengthening

- Leg press, step-up/step-down progression (advancing step height), single-leg wall slide, squat to chair
- Begin hamstring, quadriceps, and calf stretching
- Add resistance (dumbbells or ankle weights) gradually as strength allows

Precautions

- Avoid stair-stepper machines, deep knee bends, and squats past 90° of flexion
- Avoid pivoting or twisting on the knee, and any exercise that causes crunching, clicking, or pain at the kneecap

Advancement Criteria

- Good control and no pain with functional movements, including step-up/down, squat, and partial lunge
- Normal gait on all surfaces
- Single-leg balance comparable to the uninjured side

PHASE IV: ADVANCED STRENGTHENING AND RUNNING (12–16 Weeks)

Goals

- Regain full, symmetric lower extremity strength
- Continue non-impact conditioning
- Begin a structured running program, if criteria are met and cleared by Dr. Fliegel

Strengthening

- Continue Phase III strengthening with increasing resistance and fewer repetitions, 3 times per week
- Single-leg wall slide and single-leg squat progressions
- Seated leg press, avoiding letting the knees snap into full extension

Weight Training Guidelines

- Begin straight-ahead running on a soft, level surface once quadriceps strength is approximately 80% of the uninjured side and there is no pain or swelling
- Run ½ speed, then ¾ speed, then full speed over 100-yard distances, adding repetitions as tolerated
- Do not progress to the next running step until it can be performed pain-free and without swelling

Avoid

- Lunging or high-impact drills; pivoting on a fixed foot
- Squats or leg press with the knee bent past 90°

PHASE V: AGILITY AND RETURN TO SPORT (16+ Weeks)

Goals

- Safely recondition the knee for the demands of sport or work
- Restore sport- or work-specific movement control, including impact
- Provide objective criteria for a safe return to activity

Progression

- Impact control drills: progress from two feet to two feet, to one foot to the other, to one foot to the same foot
- Direction-change running: zig-zag, backward run, circle run, figure-eight run, carioca, shuttle run, box drill, and agility run, each added progressively
- Sport- or work-specific balance, proprioceptive, and strength drills

Return-to-Sport Criteria

- Dynamic neuromuscular control with multi-plane activity, without pain or swelling
- Strength within 90% of the uninjured side
- Range of motion even bilaterally; single-leg balance comparable to the uninjured side
- Patient-reported pain level of 4 or lower
- Successful completion of hop testing and agility testing before return to sport

Key Rehabilitation Principles

- Protecting the meniscal repair takes priority throughout early rehabilitation — meniscal tissue heals more slowly than bone, and the restrictions on flexion and weight bearing in Phases I and II exist specifically to protect the repair while healing occurs.
- Avoid squatting, pivoting, or twisting on the knee until cleared, and progress each phase based on meeting the stated criteria rather than by the calendar alone.
- Contact our office for fever, increasing redness or drainage from the incision, significant swelling or pain, a locked knee, or inability to bear weight.
- Please arrange to return to Dr. Fliegel's office 10 to 14 days after surgery, and again at approximately 8 weeks.