VCU Sports Medicine Clinic

Microfracture repair protocol

All time frames are to be used as general guidelines only. Achievement of goals is the primary criteria for advancement to the subsequent phase of rehab.

Phase I Protective phase (weeks 0-6)

Goals

1. Isolated quad set in full extension
2. Zero degree active knee extension with no lag during straight leg raises
3. Zero to 120 degree of active assistive range of motion, if permitted by doctor
4. Minimal knee effusion
5. Independent weight bearing with assistive device per weight-bearing precautions

(Week 1)

Exercises Basic home excercise program consisting of ankle pumps, straight leg raises (supine, sitting, abduction), active assistive range of motion into flexion (heel slides), prone hangs/heel props, hamstring stretches, abduction with external rotation in side-lying position with knees bent to 45 degrees, prone knee extensions, gait training, toe touch weight bearing

Modalities Electrical stimulation, biofeedback, JOBST (or ice, compression, elevation), continuous passive motion

Frequency Two to three times per week as indicated by evaluation

(Weeks 2-3)

Exercises Continue with above; add quad sets at 15, 20, 25 and 30 degrees of extension, abduction to straight leg raise program, total knee extension with theraband in standing (partial weight bearing), ankle strengthening (heel raises partial weight bearing)

Modalities Continue with above modalities

Frequency Two to three times per week as indicated by evaluation

(Weeks 4-6)

Exercises Continue with above; may discontinue straight leg raises in supine/side-lying position and heel pumps, continue with stretches until full extension is achieved. Add four-way standing leg raises in standing using theraband for resistance on the operated leg, standing leg curls, stationary bike if approved by doctor, total gym at levels lower than five for two-legged mini-squats at 45 degrees or less, resisted hip external rotation, multi-hip machine, dynamic trunk stabilization exercises, gait training with increased weight-bearing status with assistive device as permitted by doctor, aquatic therapy (water jogging, resisted running, swimming, water aerobics)

Modalities Continue with above. May discontinue continuous passive motion if range of motion is adequate.

Frequency Once or twice per week

Phase II **Controlled stability (weeks 6-10)**

Goals

1. Independent ambulation without assistive device and no deviations
2. Independent with stairs
3. Range of motion 0 to 130+ degrees
4. Single-leg balance for more than 15 seconds

(Weeks 6-8)

Exercises Continue with above but begin working on endurance by increasing the number of repetitions done, more biking, gait training (weight-bearing as tolerated), adding resisted side stepping (straight, diagonal CW, CCW), increase the level of the total gym and move to single leg as tolerated; add wall slides and single-leg stance activities for balance (heel raises, reaching activities, sole roll, BAPS, closed kinetic chain activities)

Modalities As indicated

Frequency Once or twice per week

(Weeks 8-10)

Exercises Continue with above. Add elliptical trainer/Nordic track, step ups (2, 4, 6 and 8 inches), balancing activities (static and dynamic), sport cord, treadmill forward and backward, leg press, leg curls, mini-tramp, whole-body balance strategies

Frequency As indicated

Phase III **Functional strengthening (weeks 10-16)**

Goals

1. Increase strength to allow for functional progression
2. Improve balance and proprioception to allow for functional progression
3. Restore local muscular and cardiovascular endurance

Criteria for entering phase III

1. Satisfactory clinical exam
2. Full active/passive range of motion
3. Normal gait pattern and reciprocal stair negotiation

Exercises Begin four to six sets of 8-20 repetitions of the current weight program; progress to single-leg activities and eccentric control; emphasis on closed kinetic chain activities; progress to unstable surfaces for balance/coordination – slide board, Swiss ball, balance beam, fitter etc.; endurance activities – interval training; bike, stair stepper, elliptical trainer/Nordic track, slide board, treadmill walking, aquatic activities

Frequency As indicated

Phase IV **Return to function (weeks 16-24)**

Goals

1. Normalize strength, proprioception and endurance

2. Prepare for return to sport/occupation
3. Provide confidence in performance of the knee

Criteria for entering phase IV

1. Satisfactory clinical exam
2. Girth within 1 inch or isokinetic test less than 25 percent deficit
3. Equal single-leg stance

Exercises Continue with phase III activities decreasing the number of exercises while increasing the intensity of the program; progress to a maintenance program by decreasing sets and reps, increase the load, decrease time and increase power, increase rest and recovery

Frequency As indicated

Prepare for return to sport by progressing eccentric strength for control of increased speeds, loads and directions and progress for direction, speed and variations. Recognize that impulse loading activities such as jumping need to be minimized during the early period of functional return.

Step 1: *Jog progression* – Fast walk, high knee march, cariocas, figure 8, four-way reaction drill, eccentric step-offs/loading and jog

Step 2: *Double-leg jump progression* – Shuttle (speed/load), jump rope (speed/duration), line jumps (direction/height/speed), box jumps (direction/height/speed), distance jumps (direction/height/speed)

Step 3: *Sprint progression* – Increase speed of all above drills, add sport replication activity

Step 4: *Single-leg hop progression* – Shuttle (speed/load), jump rope (speed/duration), line jumps (direction/height/speed), box jumps (direction/height/speed), distance jumps (direction/height/speed)

Return to sport/occupation criteria

1. Satisfactory clinical examination
2. Less than 10 percent isokinetic strength deficit for quads
3. Satisfactory completion of sport-replication activity
4. Pass single-leg functional test, the average of three trials with less than 15 percent deficit
    a. Single-leg hop for distance
    b. Single-leg triple cross-over hop for distance (15 cm wide)
    c. Single-leg hop for time over 6 meters
    d. Single-leg hop for vertical height