Arthroscopic Hip Surgery

Post op Rehab Protocol

Bryan Graham, MPT; Contact @772-283-3820 and Dr. Dominic Carreira

**** Exercises and timeline for progression is a guideline and may be adjusted based on the patient/athlete's age, weight, and individual needs

Phase 1: Protective (Weeks 1-6 Days 1-42)

Patient Instructions:

1) The hip arthroscopy protocol packet for recovery from surgery provides important guidelines for the patient.
2) Wear the brace for first 3 weeks when standing or walking
3) Wear the compression stockings for 4 weeks
4) Avoid prolonged (greater than 30 minutes) positioning at 90 degrees hip flexion for 2 weeks; such as sitting in a chair or sleeping in the CPM with hip in high flexion to prevent tightness in the front of the hip
5) Lay on stomach 1 hour per day to prevent hip tightness. May use a small pillow under the waist to prevent back pain. **Laxity patients treated with a capsular plication will begin this at approximately 2 weeks post op, depending on hip tightness.** The goal is for 0° of hip extension, not hyperextension; mattresses or couches that sag significantly should be avoided.
6) Continuous Passive Motion Machine: (4 to 6 hours/night)
    a. Begin with limits set at 30 degrees and 70 degrees
    b. Progress 10 degrees in each direction per week
    c. Do not exceed 0-120 degrees
    d. During the last week of CPM use, reduce time in the CPM 1 hour/night
    e. If capsular plication was performed, limit hip extension on CPM to 30 degrees for the first 3 weeks.
7) May sleep on the non-surgical side immediately after surgery, but must have a pillow between the knees and theraband strap around the feet.
8) Encourage the use of the patients hands when rotating the leg in and out of bed, the car, or from a sitting position to reduce psoas irritation and capsular strain.
9) **You may also visit: https://www.youtube.com/watch?v=HQhAO1JQMp8 for a video on post op care.

Precautions:

1) Brace: (set at 30-90-degree range of motion)
    a. The brace will be worn for 3 weeks by all patients except for joint hyper mobility

patients treated with capsular plication will wear the brace for 4 weeks. **In all patients reset extension limits of the brace to 0 degrees extension at 2 weeks post op.**

2) Weight Bearing:
   a. **Non-Micro: PWB (approx.. 50%)** with walker or bilateral crutches for 2 weeks. Progress to WBAT with crutches or walker for additional 1-2 weeks. Patient should be absent of signs of compensatory gait prior to discharge from crutches or walker. No Trendelenburg or painful gait.
   b. **Microfracture:** Foot-Flat with walker or crutches for 6 weeks for patient following micro fracture procedure. (Exception: See Alter G guidelines for gait training). Then progress to PWB for 1 week, followed by WBAT. Discharge of walker or crutches when normal gait mechanics are achieved. (as noted above for non-micro)
   c. **Laxity/Plication:** Foot-flat for standing balance only. PWB (50%) through forefoot for 2 weeks with walker or crutches. Progress to WBAT over an additional 2 weeks with brace set at 0 degrees extension and 90 degrees flexion. Discharge walker or crutches when normal gait mechanics are achieved. (as noted above for non-micro)

3) ROM Restrictions:
   a. Hip Flexion: Do not push through pain or pinching.
   b. Extension:
      i. Non-Micro and Micro patient: NO passive or forced open chain extension past neutral for 3 weeks
         1. Weight bearing extension limited by brace
      ii. Capsular plication patient: NO passive or forced open chain extension past neutral for 4 weeks
   c. Abduction: 45 degrees for 4 weeks
   d. Internal Rotation:
      i. Supine: Hip flexed to 70 degrees- 20 degrees for 3wks
      ii. Prone: No limits within the comfort of the patient (Log roll)
   e. External Rotation:
      i. Supine: Hip flexed to 70 degrees- 20 degrees for 3 wks
      ii. Prone: 0 degrees for 3 weeks
      iii. If plication was performed or in joint laxity cases no external rotation for 4 weeks.

4) AROM: NO ISOLATED Active or Active resisted hip **FLEXION** during transfers and positioning for 3 weeks.
   a. Avoid active straight leg raise and hip flexion in sitting. This limits irritation and possible tendonitis.
   b. May use upright stationary bike (without clips for 12 weeks), Alter G and community ambulation with assistive device within the weight bearing limitations.
   c. Active ankle pumps may be performed with the leg elevated at the ankle starting on the first therapy visit and performed as home exercise through the day. 20-25reps per session

Initial Exercises:

1) **Isometrics**: 20 repetitions, 2-3 x/day

Begin all exercises the first physical therapy appointment unless instructed to start later.

1) Gluteal sets: Tighten buttocks- hold for 5 sec each repetition
2) Quad sets: Tighten quads/thigh muscles by pushing knee into the table. Hold 5 sec. each rep.
3) Transverse Abdominals: Draw belly button in towards the table without causing a pelvic tilt. Hold for 5-10 breaths.

2) Passive ROM and Home Exercises: Performed 2-3x/day for 4-6 weeks at home.

**Proper instruction of all home care givers is key to the success of the PROM. Use of an IPad or smartphone to record the therapist during the first therapy visit can be used for good home reference.

1) Circumduction in Flexion: In supine flex the hip, not exceeding 70 degrees. Knee is bent at 90 degrees. Move the thigh in a circular fashion within the ROM limitation above. Rotation should be in both a clockwise and counter-clockwise rotation. Circumference of the circular pattern is not to exceed the circumference of the base of the thigh. **Perform in each direction 3 minutes**
2) Flexion: In supine. The therapist or caregiver elevates the leg flexing the hip by bringing the knee towards the chest. Do not force the motion and avoid "pinch" in the groin. **Perform 20- 30 reps**
3) Supine External Rotation: Flex hip to 70 degrees with knee flexed at 90 degrees. Slowly rotate the foot inward towards the opposite leg. Limit ROM to 20 degrees and avoid pain. **Perform 30 reps.**
4) Supine Internal Rotation: Flex hip to 70 degrees with the knee flexed at 90 degrees. Slowly rotate the foot outward. Avoid pinch in the joint. **Perform 20-30 reps.**
5) Circumduction in neutral: In supine. With the knee straight, bring the leg out into slight abduction and flexion. Hand placement at the heel and under the knee or calf. A circular motion is then performed in both a counter clockwise and clockwise rotation. Again, the circumference of the motion is no larger than the circumference of the base of the thigh. 20-**30 reps in each direction**
6) Abduction: In supine. Keeping the leg straight the therapist or caregiver will pull the leg away from the midline of the body. ROM limit: 40 degrees for 4 weeks. **Perform 20-30 reps.**
7) Prone Internal Rotation: With the patient on their stomach, flex knee to 90 degrees and slowly move the foot away from midline of the body. **Perform 20-30 reps.**
8) Prone External Rotation: 0 degrees for 3 weeks. After 3 weeks, with patient on their stomach, flex knee to 90 degrees and slowly move the foot in towards the midline of the body. If plication was performed or hip laxity cases limit prone external rotation to 0 degrees for 4 weeks.

3) Stationary Bike: Start on day 1 after surgery depending on the patients' post op pain levels

1) Upright bike (no recumbent) Avoid hip flexion past 90 degrees for the first 2 weeks. Seat should be adjusted to insure the hip flexion is not past 90 degrees. Also, in some cases the patient may need to sit upright and avoid reaching forward to the handle bars to avoid flexion past 90 degrees as well. These instructions are to carry over to the home if the patient will be using a bike at home. If this cannot be maintained at home then the bike will not be part of the home program. Cadence 30-50 RPMs with no resistance x 6 weeks, then light resistance x 6 weeks.
2) Avoid clipping in or strapping the foot of the involved side to the pedal until 12 weeks post-

op . This is to avoid hip flexor stress.

3) The uninvolved side may be clipped in or strapped however. This will help limit the amount of active work the involved limb with perform. Therefore, limiting hip flexor stress.
4) **20 minutes per session and up to 2 sessions per day. Increase 5 min/week up to max of 30 minutes.**

4) Alter G Gait Protocol:

If Alter G anti-gravity treadmill is available the following protocol may be followed.

1) Non-Micro Fracture Patients:
    a. Begin the Alter G at 1wk post op at 40% weight bearing depending on patients pain tolerance
    b. Progress per the patient's tolerance or 10% each week to 100%
    c. Progress to standard treadmill when full weight bearing is achieved without pain and with a normal gait pattern. Do not exceed 3.0 mph.
    d. Pace:
        i. Week 1: 1-1.5mph
        ii. Week 2: 1.5-2.0mph
        iii. Week 3: 2.0-2.5mph
        iv. Week 4: 2.5-3.0mph
        v. **Do not exceed 3.0mph**
        vi. **Progress speed based on patients' pain levels. All gait should be pain free.**
    e. The goal is to maintain a pain free gait and to achieve a normal gait pattern.
2) Micro Fracture:
    a. Begin the Alter G at 2 weeks post op at 20% weight bearing.
    b. At 6 weeks post op begin to progress to 50% as able.
    c. At 8 weeks gradually progress to 75% weight bearing.
    d. Goal is to achieve 100% weight bearing by 10 weeks.
    e. Follow pace schedule as above but not to exceed 3.0 mph and must be pain free.
    f. Same pace as that described in 1).
3) Plication and Joint Laxity:
    a. Begin the Alter G at 2 weeks post op at 40% weight bearing
    b. Progress per patient tolerance or 10% each week to 100%
    c. Follow the pace schedule as described, but not to exceed 3.0 mph before end of 6th week
    d. May progress to standard treadmill once FWB is achieved and without pain and normal gait mechanics. Do not exceed 3.0 mph until 12 weeks postoperatively.

Ambulation on the Alter G should be pain free. Do not progress the patient's weight bearing or speed until they have achieved pain free gait at the previous level.

5) Stretching: Phase 1

- **a. Supine Hip flexor:** Lie on your back and lift the **non-surgical** knee to the chest. Hold 30 sec and repeat 3 reps twice a day. (Laxity patient begin at 2 weeks post op)
- **b. Hamstring:** With patient in Long sit position and core tight have them reach for their feet. Hold for 30 sec. and repeat 3 reps twice a day. Do not push through a painful pinch in the groin/hip
- **c. Prone Quad Stretch:** With patient in the prone position. Use one hand to support the pelvis and lower back. The other hand placed on the foot and ankle of the surgical limb. Slowly bend the surgical knee bringing the foot and ankle towards the buttocks. Hold for 30sec and repeat 3 reps twice a day. **(Laxity patients begin at 2 weeks post op)**
- **d. Piriformis: (Begin at 3 weeks post op)** With patient in the sidelying position on the

non-surgical limb and hips stacked. Flex the involved limb to 50-70 degrees and hook the foot behind the uninvolved knee. With the involved side supported and pelvic stabilized, lower the knee towards the table. A pillow may need to be placed under the involved side knee initially. Avoid a pinch in the groin or increased pain. Hold 30 sec. and repeat 3 reps twice a day.

e. **Supine FABER/Figure 4:** (**Begin at 3 weeks post op)** In supine, bring the involved limb into the Figure 4 position with the ankle resting on the uninvolved knee (may need to begin with foot resting on the shin). Gently lower the involved knee towards the table. Do not push on the knee. It is normal to feel lateral hip discomfort. Hold 30 sec and repeat 3 reps twice a day. **(Laxity patients will begin at 3-4 weeks post op depending on anterior hip tightness)**

6) **Strengthening: (Do not add leg weights to lower extremity during open chain exercises)**
   a. **Cat and Camel:** Kneeling in quadruped position. Start with the back in neutral and rotate the pelvis posteriorly while arching the back and tightening the core. Then reverse the direction while rotating the pelvis anterior and extending the back and lifting the head. **Perform 3 sets of 10 reps 2x/day. Begin at 2 weeks post op.**
   b. **Sliding Standing Hip Abduction:** Standing with weight on the non-surgical leg and the involved limb straight with slight internal rotation and foot on a sliding disc. Slide the surgical limb to the slide (Abduction). Pay close attention to make sure the gluts are activating to produce the motion. Do not lean away from the moving limb. **Perform 3 sets of 10 reps 2x/day. Begin at 2 weeks post op**
   c. **Neutral Clams:** In sidelying on the non-surgical side with hips stacked and hips and knees aligned in neutral. With the core tight engage the gluts and slowly lift the knee while keeping the heels together. Avoid rotating the back while lifting the knee. **Perform 3 sets of 10 reps 2x/day. Begin at 3 weeks post op or after patient is clear to perform hip external rotation.**
   d. **Prone Terminal Knee Extension:** In the prone position with toes of the surgical leg pointed into the table. Activate the gluts of the surgical limb to begin hip extension lifting the knee off the table without lifting the toes. Focus on activation of the gluts before the quads to initiate the hip and knee extension. **Perform 3 sets of 10 reps 2x/day. Begin at 3 weeks post op or after the patient is clear to perform hip extension.**
   e. **Double Limb Bridging:** In supine with the hips and knees bent (hook lying position) to 135 degrees, keep the core tight while slowly raising the buttocks off the table with focus on glut activation during the exercise. Stop lifting the hips once in a neutral pelvic position. Avoid over extending the hips and or back. **Perform 3 sets of 10 reps 2x/day. Begin at 3 weeks post op.**
   f. **Quad Rocking:** Kneeling in quadruped position and core tight begin rocking backwards onto the heels. Do not push through a pinch in the groin. Then rock forward dropping the hips into a half plank position while keeping the core tight. Avoid extension of the hips or back. **Perform 3 sets of 10 reps 2x/day. Begin at 3 weeks post op.**

7) **Aquatics: Begin at 3 weeks post op. Must cover the incision sites with waterproof dressing for at least 1 week after suture removal or unit wounds are completely closed. Can swim with pull-buoy.**
   a. **Walking:**

i. Begin in chest deep water and progress slowly to waist deep water as tolerated.
ii. Perform walking backwards and laterally for 4 min each.
iii. Avoid forward walking and marching type activities

b. **Standing Abduction:**
i. Standing in at least waist deep water and hold on to the side of the pool.
ii. Stand on the non-surgical leg and lift the surgical leg directly to the side and return to the starting position
iii. Keep the foot of the surgical leg pointing forward or slightly turned in
iv. Perform 3 sets of 10-15 reps
v. Progress to letting go of the side pool once able to lift the surgical leg without lean towards the non-surgical side

c. **Squats:**
i. Standing in waist deep water
ii. Bend the hips and knees keeping the chest high and leading with the buttocks
iii. Do not pass a parallel position of the thighs to the bottom of the pool or water to the shoulders
iv. Complete the motion by pushing up slowly to the starting position
1. Avoid hyper-extending hips
v. Perform 3 sets of 15-20 reps

8) **Criteria to progress to Phase 2:**
a. Demonstrate proper glut medius activation during prone TKE's (avoid hamstring dominate motion)
b. Full weight bearing (Non-weight bearing exercises can be progressed if full weight bearing is not achieved due to microfracture)
c. No pain with phase 1 exercises

Phase 2: Intermediate (Weeks 6-9)

Goals:

a. Continued protection of repaired tissue
b. Advance gluteus medius strength
c. Normalize gait mechanics
d. Full ROM

Precaution:

a. No forced stretching (especially of the hip flexors and anterior capsule)
b. No joint mobilizations or joint distraction
c. Do not discharge crutches until the patient can ambulate without pain and/or compensation (ex. No Trendelenburg gait)

Exercises:

1) **Passive ROM:** Continue with passive ROM from phase 1. May discharge from home exercise program at 6 weeks post op.
2) **Stationary Bike:**
    a. Up-Right bike only. Flexion may pass 90 degrees as tolerated. Avoid pinching and do not push through pinch or pain.
    b. Cadence under 80 RPMs
    c. May clip into pedals after 12 weeks
    d. May ride up to 45min.
3) **Walking:**
    a. Once pain free FWB has been achieved and after 6 weeks, may begin ambulation on treadmill.
        i. No incline and do not exceed 3.0 mph to avoid excess hip extension and anterior capsular stress
    b. If walking outside avoid hills and other inclines and stay on firm level surfaces
    c. Work up to 20-30 min as tolerated by the patient
    d. Should be pain free and without compensation/Trendelenburg gait
        i. Watch surgical leg extension: Patient may avoid full ROM of extension due to anterior tightness. Instruct the patient to complete the stride using the gluts so not to stress the knee or ankle
4) **Stretching:**
    a. **Partial Thomas:** Supine position with the non-surgical limb flexed and pulled to the chest and the knee of the surgical limb at the end of the table and foot hanging over the edge. **Hold for 30 sec. for 3 reps 2x/day.**
    b. **Standing or Prone Quad stretch:** Maintain a neutral pelvic alignment during either position. **Perform 3 reps of holding 30 sec.**
    c. **Standing IT Band:** Surgical limb crossed behind the non-surgical limb. Lean upper body away from the side to be stretched. Avoid pinch in the groin of the surgical limb. **Perform 3 reps of hold for 30 sec. 2x/day**
    d. **Supine Unilateral Hamstring:** Supine with hand behind the knee, gently pull leg towards the chest. Keeps foot and ankle relaxed. **Perform 3 reps of 30sec hold 2x/day**
    e. **Unilateral Standing Calf Stretch:** On a wedge to avoid excessive hip extension with traditional calf stretching. **Perform 3 reps of 30sec holds on each side 2x/day**
    f. **Supine FABER:** Continued as in phase 1. Do not force ROM

5) **Strengthening:**
    a. **Supine Flexion with Stability Ball:** Supine position with the surgical

leg supported by a stability ball in the 90/90 position. Engage the TA, then activate hip flexors to flex the hip. Slowly bring the knee towards the chest. Avoid pinching in the groin. Then slowly return to the start position. **Perform 3 sets of 10 reps. Perform bilaterally**

b. **Standing Clams (resistance band around the knees):** In a downhill skier squat position with resistance band around the knees. Keeping the ankle together open the knees pressing out into the resistance band. Focus on glut and hip external rotator activation. **Perform 3 sets for 10 reps. Progress level of resistance band as tolerated**
c. **Sidelying Hip Abduction:** Sidelying on the non-surgical side with that knee flexed Surgical leg straight and the therapist or caregiver supporting the limb parallel to the table. Have the patient place a hand on the iliac crest to stabilize the pelvis to prevent the QL from performing a hip hike. The patient then lifts the surgical leg with focus on glut activation. Try to prevent any hip flexion as this is from hip flexor compensation and unwanted. Do not add weights to the ankle for increased resistance. **Perform 3 sets of 10 reps or as able. Only perform the number of reps that can be performed with correct form and progress as able. Perform bilaterally**
d. **Double Leg Press:** On Total Gym or Shuttle. Place feet wide apart and use the quad and gluts to extend the legs. Do not squat deeper than 60 degrees hip flexion until 12 weeks. **Perform 3 sets of 10 reps**
e. **Weight Bearing IR/ER (Knee on stool or chair):** Knee of the surgical leg is placed in the center of a rotating stool or chair. Without twisting the pelvis, rotate the surgical hip into internal and external rotation. The hip should neutral (not flexed). **Perform 3 sets of 10 reps**
f. **Unilateral Bridging:** Progression from double limb bridging. Perform bilaterally. Active knee flexed at 135 degrees with non-active limb crossed over in Figure 4 position. Avoid hyper extension of the hip or back. **Perform 3 sets of 10 reps**
g. **Sidelying Hip External Rotation:** Lie on the surgical leg with knee bent to 90 degrees. Lie along the edge of the table with hips and shoulders in align and stacked and surgical foot off the edge of the table. Place the foot of the top leg in front of the knee of the surgical leg to brace the leg. Rotate the surgical lower leg and foot towards the ceiling. Focus on using the hip external rotators. Avoid compensation of the hamstrings and adductors. **Perform 3 sets for 10 reps. Initially only perform the number of reps that can be performed with correct form and no compensation. Progress as able. Do not add weight to the ankle.**
h. **Standing Terminal Knee Extension:** Begin without resistance. Add resistance once able to perform with glut dominant hip extension (no hamstring compensation). Place resistance around the thigh and not

behind the knee to avoid quad activation first. **Perform 3 sets of 10 reps. Perform bilaterally**

i. **Crab Walking:** Do not begin until patient is walking independently. Initially perform without resistance. Patient starts in a squat position with knees behind the toes, feet forward and weight through the heels. Instruct the patient to step sideways leading with or pushing out with the heel. Keep feet pointed forward to prevent anterior hip muscle compensation. As the patient demonstrates proficiency resistance bands may be added around the knees. **Perform 3 sets of 10 steps to each side**

j. **Air Squats:** Do not squat deeper than 60 degrees until 12 weeks postop. Watch to ensure the patient is using the both sides equally. If the patient is compensating with the non-surgical limb, have them place that foot slightly forward of the surgical foot. This will require the patient to use the surgical limb. Avoid twisting, valgus knee position, popping the hips with returning to stand and weight shifting off the surgical limb. Do not push into pain or a pinch. **Perform 3 sets of 15 reps. May add weight vest as the patient progresses.**

k. **Half Side Plank:** Begin at week 6. On the surgical side. Keep the knees, hips and shoulders aligned leaning on the elbow. Activate the TA and use the core and gluts to lift the hip off the floor or table. Do no arch back and avoid twisting. **Begin with short holds of 5-10 secs to avoid compensation**

l. **Full Side Planks:** Progression from side planks. May try to begin around week 7-8. Perform planks off the feet and elbow. Can progress to high plank position as well. Maintain neutral pelvis and avoid twisting and arching the back. **Begin with short holds of 5-10 and progress to a minute.**

m. **Front Planks:** Begin around week 7-8. From prone position, engage the TA and gluts and lift into a plank position with elbow under the shoulders. Maintain neutral pelvic position with no arching of the back. Can progress to high plank position. **Begin with short holds and multiple reps and work up to a minute**

n. **Step Ups Forward and Side:** Box step onto a 6-8in. step. Using the gluts and quads of the surgical limb step onto the box. Bring the opposite leg up to a 90-degree hip flexed position. Emphasize quad and glut activation of the surgical limb to stabilize limb. Pause for 1-3 sec and hold position before slowly returning to the start position. **Perform 3 sets of 10-15 reps. Perform bilaterally.**

6) **Balance:**

a. **Wobble Board Balance Squats:** On square Wobble Board place feet on the edges of the board. Have the patient perform squats maintaining the board level and not allowing the edges to touch the floor. Do not squat deeper than 60 degrees until 12 weeks postop.

Avoid valgus knee position during squats. If Wobble Board is not available a foam mat or balance discs can be used. **Perform 3 sets of 10-15 reps**

b. **Unilateral Runners Pose:** Standing in front of a mirror have the patient balance on the surgical limb with slight bend in the knee and hip and opposite hip flexed to approximately 90 degrees flexion to mimic runners pose at mid stance. In this position have the patient move the arms back and forth as if they are running. **Hold position for 30sec. Repeat 3-5 reps. May need to begin with shorter holds to prevent compensations such a lean over the surgical hip to maintain stability. Perform bilaterally.**

7) **Aquatics (starting at 8 weeks):**
   a. **Progression of exercises from Phase 1**
      i. Progress walking to forward with long strides and long arm swing. **No Marching**
   b. **Deep Water jogging with jog belt**.
      i. Easy jogging motion
      ii. Perform for 10-15 min
   c. **Kicking:** starting at 12 weeks. No whip kicks and no fins
8) **Alter G Jogging Protocol:** May begin as early as 10 weeks post op for Non-Microfracture patients.
   a. **Interval Jogging**
      i. Begin at 60% weight bearing. If the patient cannot jog pain free at 60% weight bearing they are not ready to start jogging
      ii. Interval is 2-minute jog and 1-minute walk. Repeat 5-6 reps of this interval.
      iii. Begin with a 3-5-minute walking warm up
      iv. Pace between 4.5 to 6 mph
   b. Microfracture patients may attempt jogging after 12 weeks post op.

Phase 3: Advance Strengthening: Week 12-13+

Criteria to progress to Phase 3:

1) Must be able to perform glut dominant prone straight leg raise without hamstring compensation
2) Pain free with Phase 2 exercises and performing without compensation
3) Normalized Gait
4) Hip flexion strength 4/5 and pain free with testing
5) Full ROM

Precautions:

1) No contact sports or activities
2) No forced stretching
3) No hip joint distraction

Exercises:

1) **Passive ROM:** Continue PROM from phase 1 and 2. Add soft tissue mobilization as needed
2) **Stationary Bike:**
    a. May begin classes. Perform positions 1 and 3 only. No position 2
    b. Can clip-in on pedals
    c. May begin riding bike outside.
3) **Walking:**
    a. Patient is clear to walk outside on all surfaces as along as pain free and without compensation
4) **Stretching:**
    a. **Full Thomas stretch:** Sit at the very edge of the table. Lie back pulling the non-surgical leg to the chest. Surgical leg is left to hang from the edge of the table. No added pressure is to be applied to stretch. **Hold for 3 sets of 30 sec. Perform bilaterally**
    b. **Figure 4 Piriformis:** Supine position. Cross the surgical leg over the non-surgical in a "figure 4" position. Pull the non-surgical limb to the chest. Do not push the knee of the surgical leg out. **Hold for 3 sets of 30 sec. Perform bilaterally.**
    c. **Continue all other lower extremity stretches as needed**
        i. Do not force stretches and no bouncing during the stretches
5) **Strengthening:**
    a. **Progression of Phase 2 exercises as able and tolerated**
    b. **Unilateral Split Squats:** Stand on the surgical limb with the non-surgical leg propped on a box or step behind the patient in a static lunge position. Slowly lower into a single leg squat. Do not squat past parallel of the floor and keep the knee behind the toes and tacking over the foot. Avoid valgus alignment of the knee during the exercise. **Perform 3 sets of 10-15 reps. May add weighted vests for increased load as needed and tolerated**
    c. **Lateral Slide Squats:** Stand with feet slightly wider than shoulder width with the non-surgical foot on a slide disc. Lower hips towards the floor with the surgical leg and sliding the non-surgical leg to the side. Return to starting position by pushing through the bent leg. **Perform 3 sets of 10-15 reps. Perform bilaterally. Do not push through pain when sliding the surgical leg to the side.**
    d. **Star Drill Squat Exercise:** Place one cone to the side, 45-degree angle

behind and one straight behind the non-surgical limb. Place each cone approximately 2ft away from the patient. Taller patients may need more distance from the cones. Reach out to each cone with the non-surgical limb by lowering the hips using the surgical limb. Avoid knee valgus alignment of the knee when lowering the hips. **Repeat process 10 times. Perform 3 sets**. **Perform bilaterally.**

e. **Wall Acceleration Drill-March:** Start standing 2-3ft from wall and facing the wall. Lean forward placing hands on the wall straight out in front of you. Lift the surgical limb by flexing the hip and knee. Keep the foot dorsiflexed. Pause and hold for 1-2 sec. Repeat with opposite side in a "Marching" fashion. **Perform 3 sets of 10 cycles. Can progress to faster changes and combinations. (Ex. Right/Left/Right or Left/Right/Left)**

6) **Balance:**
   a. **Unilateral Runners Pose:**
      i. Add foam, balance disc or wobble board to increase level of difficulty
      ii. Can also add weight to the hands
7) **Conditioning:**
   a. **Stairmaster**
   b. **Swimming**
      i. Can add fins after 12 weeks post op if pain free when using them
   c. **Jogging:**
      i. If the patient started on the Alter G and has been able to jog at 95% weight bearing for 2 sessions pain free, they may progress to regular treadmill as long there is no pain and no compensation during the transition.
      ii. If no Alter G is available, slowly introduce jogging on the treadmill after 10 weeks post op. (After 12 weeks for microfracture patients)
         1. Patient must be ambulating without pain or compensation to progress to jogging
         2. Begin with short intervals of walking to jogging. Ex. 1-minute jog/1-minute walk or 30 sec/30 sec.
         3. Progress as tolerated
      iii. All patient can return to jogging outside once they have transitioned to jogging FWB on the treadmill for 2 weeks without development of pain or compensation.
   d. **Ellipticals:** Not recommended due to anterior hip stress

Phase 4: Sports Specific Training (week 14+)

Criteria for to progress to Phase 4:

1) Pain free with all previous exercises
2) Jogging without pain
3) Hip flexor strength of at least 4+/5
4) Hip Ext, ADD/ABD, IR and ER strength 5/5
5) Stable unilateral squat without pelvic drop

Exercises for Phase 4:

1) Lateral Shuttle
2) W-Drills
3) Z-Cuts
4) Low level Plyometrics
5) Acceleration drills
6) Gradual introduction of sport specific drills and activities

Criteria for Discharge and Return to Sport

1) All hip strength 5/5
2) Pain free with all sport specific drills
3) Demonstrates proficiency during sports specific drills
4) Demonstrates Glut dominant hip extension

****** At Discharge, the patient is cleared to return to sport for one month of non-contact drills and conditioning prior to return to full practice and competition**

******If there is a question regarding individual patient progression or patient response to the protocol please contact Dr. Carreira at 404-355-0743 or Bryan Graham, MPT at 772-283-3820.**