Hip Arthroscopy Rehabilitation Protocol

This protocol is designed to accompany and reflect the surgical techniques of Dr. Garrett Kerns, DO. You can use videos for initiating your rehab at www.cuhipclinic.com for further assistance (Permission was given by Dr. Mei-Dan my trainer and mentor). Exercises that have an accompanying video demonstration will be noted within this protocol. This protocol begins with lists of exercises within stages of healing, and pictures with accompanying descriptions later in the protocol for the first three stages.

The following instructions will be guidelines for you to follow as you progress from the day of surgery through your rehabilitation process. It is imperative to understand that your progress will **NOT** be linear; it will fluctuate up and down, and everyone progresses at varying rates throughout the rehab process. It is important to identify what YOU CAN do, do it well, and progress from there.

Although this protocol gives timelines, it DOES NOT mean you will be capable of appropriately performing all exercises at that particular point in time. You will need to progress at the rate your body allows, including backing off to allow recovery as needed. Soreness and stiffness are sensations to work through. Sharp pain demands that you stop, listen, and back off activities or perform different activities, to help dissipate the pain. If this occurs, back off exercise intensity to assist recovery, and consider resuming less intense exercises to maintain muscle recruitment patterns. If increased pain persists, consult your physical therapist to see if an alteration in your program and/or form with exercises is necessary.

It is not unusual to require skilled physical therapy intervention more than 3-4 months after surgery. Become apprised of your insurance contract so you can best utilize your physical therapy benefits throughout your post-operative rehabilitation.

BASIC POST-OPERATIVE INFORMATION:

For patients, we encourage you to begin physical therapy sessions approximately 2 weeks after surgery. Please schedule your appointments to start physical therapy after your first post-operative visit with Dr. Kerns.

Your first post-operative visit with Dr. Kerns will typically be within the first 2 weeks of surgery. At that visit, he will review any weight bearing precautions you may have and discuss the next stages of healing and/or rehab.

Typical ***PRECAUTIONS*** following hip arthroscopy:

For 3 weeks after surgery:

1. Weight Bearing (WB) instructions will have been communicated per surgical findings.
2. No lying or sleeping, on your belly.

For 4 weeks after hip arthroscopy, unless otherwise advised by Dr. Kerns:

3. No hip flexion more than 90 degrees. This means no bending forward and putting on shoes.
4. No hip external rotation beyond 0. This means your knee should not rotate outward from your hip and foot while sitting. When your legs are straight and relaxed, your foot and your knee cap may rotate out mildly, but do not actively pursue more of this motion. If you have more soreness in this position, support your leg for less of this resting position.
5. No hip extension beyond 0. This means no hip flexor stretching with your leg behind you, no long strides when you walk, and no trying to push your leg behind you.

Timelines for initiating stage 2, stage 3 and stage 4 all appear close together. Variations through these stages may include examples of the following:

1. Some patients may be able to initiate stages sooner than others based on functional capabilities or surgical intervention.
2. Some patients may perform a combination of exercises that cross between 2 or 3 stages.
3. Frequency and volume of exercises may vary daily based on tolerance, and will vary amongst patients.

Consult with your physical therapist about the volume of exercises as you advance, including which activities to discontinue, and how to modify an activity if painful or uncertain of form.

The goal of this protocol is to assist with progression according to abilities, and NOT moving forward with exercises solely based on a time line. Weight bearing (WB) exercises will be delayed if you had a microfracture. To allow for cartilage healing, timelines for other WB activities will be delayed, at least up to the length of time you are non-weight bearing (NWB) after surgery.

CRUTCH FIT: SEE VIDEO

We suggest that you prepare ahead of surgery by fitting your crutches, and practicing ambulating around your home to improve comfort level, coordination, and safety. Instructed crutch use may have weight bearing variations from 2-4 weeks post-operation, and can exceed 6-8 weeks post operation, depending on extent of repair during the surgical procedure. Crutches are to be utilized until you no longer limp. DO NOT progress to use of only 1 crutch as this encourages you to lean away from the surgical side, contributing to faulty gait mechanics. See crutch handout at www.cuhipclinic.com for further details.

UPRIGHT STATIONARY BIKE: SEE VIDEO

Setting up your stationary bicycle at home, is recommended prior to surgery. You will begin a no resistance, range of motion focus cycling session, for up to 3-5 minutes the evening of your surgery. As tolerated, add 1 minute per session daily, for 2x/day. A bike trainer can be used, provided you are able to get on/off the bike safely. A stool set up behind a bike trainer is recommended to assist getting on and off the bike. We recommend you practicing getting on and off your stationary bike prior to surgery, while keeping in mind your post op ROM precautions, to improve confidence and coordination following surgery. For bilateral hip scopes, we recommend a stool set up behind your bike to assist with getting on and off. An upright trunk position is to be maintained while cycling, to ensure hip flexion stays below 90 degrees during your first 4 weeks after surgery.

WEIGHT BEARING STATUS RELATED TO MICROFRACTURE:

If your surgical procedure includes microfracture, it is likely your weight bearing status will be limited for up to 6 weeks. This is due to cartilage damage contributing to exposed bone within the joint. The microfracture procedure entails creating several holes placed into the bone to facilitate bleeding. Blood growth factors can stimulate the formation of a new layer of cartilage, over the exposed bone, where the cartilage was missing. You will be informed of weight bearing precautions upon discharge from the surgical center. This intervention will contribute to a longer duration of focus on performing fundamental exercises in this protocol. Protection during this initial phase is critical for optimal cartilage healing and long term surgical outcome.

RECOMMENDED MAINTENANCE SPECIFIC TO YOUR HIP:

As you advance function and activities, we recommend a 2-3 x/week exercise program to maintain the strength of the lateral and posterior aspect of your hip, including flexibility within hip flexors, hip rotators (figure 4 motion) and hip ROM. Keep in mind; many patients develop altered movement patterns, tightness and weakness for months or years prior to surgery. Continued specific exercises on the areas, with greater deficits prior to surgery, will help you over time.

Stage 1: Initial Mobility and Muscle Activation/Isometrics:

Post-operative, initiating day 2-4+:

Goals of Stage 1:

1. Introduce progressive weight bearing to your walking with crutches (provided surgical procedure allows.
2. Introduce and tolerate isometrics/muscle activation and range of motion (ROM)
3. Increase your body's overall tolerance to activities of daily living, household walking, and crutch ambulation.
4. Reduce swelling, increase sensation, and decrease pain.

Exercises for Stage 1: Initial Mobility/ROM: Refer to Video

1. Reverse butterfly
2. Pelvic tilts
3. Ankle pumps/circles
4. Passive Range of Motion (PROM) if able to instruct family member to assist.

Exercises for Stage 1: Muscle Activation/Isometrics: Refer to Video

1. Quad sets
2. Short arc extensions
3. Hamstring/glut isometrics, avoiding external rotation
4. Hook Lying Hip Abduction Isometric/"Isometric butterfly" to neutral with band

Exercises for Stage 1: Core Activation: Refer to Video

1. Transverse abdominus isometrics, knees bent/feet flat
2. Samurais

Refer to Video and instructions within this packet

Physical Therapy should include, but not be limited to:

1. Soft tissue mobilization for desensitization, pain, and swelling.
2. Modalities as needed.
3. PROM: flexion up to 90 as tolerated, abduction to 25 degrees as tolerated, IR as tolerated in hook-lying and leg extended position, circumduction in pain-free ROM.
4. Gait training/bed mobility/functional training.
5. Initiation of upright stationary bicycle as sitting tolerance allows, begin with 3-5 minutes the night of surgery.

Criteria to move to Stage 2:

1. Tolerance of at least 50% WB on surgical side, provided no microfracture performed.
2. Minimal to no pain with ADLs while using crutches.

3. Fair to good quad tone.
4. Tolerating PROM up to ranges allowed within Stage 1 with minimal to no pain.
5. Achieve up to 90 degrees of passive hip flexion with minimal to no pain.

Stage 2: Range of Motion and Muscle Activation: Post op week 2-3+

KEY TO STAGE 2 & 3: MUSCLE ACTIVATION IN THE OUTER/BACK BUTTOCK AREA

Without getting appropriate muscle activation in the back and outside of your hip, you will continue to overuse other musculature and struggle with pain and dysfunction. The most common dysfunction involves over activation of the front and groin musculature and under activation of the back and outside hip musculature. Neuromuscular function is often altered around the hip due to pain and inhibition in many patients prior to surgery. Relearning will require diligence and time. Your overall rehab and recovery will be more successful if you master this foundational stage and stage 3. Mastering these exercises may take longer than the duration of time noted in this packet.

Goals for Stage 2:

1. Increase muscle activation in appropriate muscles, especially the outside and backside buttock region.
2. Increase function while minimizing hip flexor or groin pain with ADLs.
3. Increase ability to bear weight on your surgical side while maintaining appropriate trunk position, and stabilizing with your buttock area, NOT hip flexor area, provided no microfracture was performed.
4. Work toward weaning off crutches, ONLY if you can do so without a limp, provided no microfracture performed.
5. Increase ROM as pain and function tolerate.

Exercises within Stage 2: These exercises are listed from easier to harder. Perform the later exercises if you can do so within the instructions & guidelines of the packet. Resume any exercises from Stage 1, if an exercise in Stage 2 is too challenging or painful. Move forward with Stage 2 exercises as you can, while remaining painfree. Consult your physical therapist regarding volume and form with exercises, if you feel overwhelmed or too challenged.

No Prone position, or lying on your belly, until week 3.

Continue no resistance stationary cycling, until at least 4 weeks post op for non-microfracture patients and 6 weeks for patients with microfracture. Increase cycling duration up to 30 minutes 2x/daily, provided there is no pain. Athletes who can tolerate a longer period of time, without increased pain, may slowly increase time over the suggested 30 minutes. Initiation of upper body strengthening activities can be added when tolerated, so long as post op hip weight bearing and ROM restrictions are followed.

Stage 2: Pool Therapy: Initiate walking, introduction to WB movement, light conditioning and proprioception, after incisions heal, and permitted based on surgical procedure.

Refer to Video and the Pool Therapy Protocol.

Exercises for Stage 2: ROM: Refer to Video

1. Continue Stage 1 ROM: reverse butterflies and pelvic tilts as needed.
2. Supine hip flexion with feet on ball, working within post op precautions
3. Prone terminal knee extension, variation of position from quad set on your back (week 3)
4. Prone active knee flexion, when easy - progress to resisted knee flexion in prone/sitting (week 3)
5. Prone active hip internal rotation (week 3) with core engaged to dissociate pelvic/hip motion

Exercises for Stage 2: Muscle Activation: Refer to Video

1. Standing hip abduction with surgical side moving, standing on nonsurgical side
2. Supine bridges-see instructions for progressions, as you gain strength (if no microfracture)
3. Prone isometric hip IR: options within instructions page (week 3)

4. Modified clamshells (or clamshells) to neutral until week 4, increase motion thereafter

Exercises for Stage 2: Core Stability: Refer to Video Stage 1: Core Stability

1. Continue with samurais/samurai progression, see instructions

Refer to instructions within this packet in addition to the videos.

Exercises for Stage 2: Other options for ROM/Muscle Activation/Core Stability: Refer to instructions in this packet

Especially helpful for patients with microfracture and WB limitations.

1. Sidelying hip abduction, progress to sidelying hip abduction sequence: abduction/kicks/rotations
2. Ball exercises: below are examples appropriate during this time.
    a. Straight leg bridges, progressing to bent knee bridges, hamstring curls
    b. Prone over ball + leg lift, progress to opposite arm/leg lift
    c. 90-90 pushes supine and sidelying: helps to initiate muscle recruitment for squats (microfracture patients may start this after WB walking is initiated.)
3. Bent knee fall outs

Refer to instructions within this packet.

PT should include, but not be limited to:

1. Continued PROM and soft tissue work as needed
2. Modalities as needed for pain and/or swelling
3. Assistance with form, progression of exercise program, including other activities within patient's ability to help transition through Stage 2
4. Pool-based strength, ROM, and proprioception
5. Core strength and stability

Criteria to move to Stage 3:

1. Improved strength of gluteus medius and maximums to a minimum 3+grade.
2. Successfully identify appropriate hip muscle engagement when performing exercises, without hip flexor or groin agitation.
3. Symmetry with sitting & bed mobility with use of surgical side.
4. Up to 75% WB status with crutches, or up to full weight bearing, without limping, provided no microfracture.

Stage 3: Muscle activation and Weight Bearing Transition: Post op Week 4-5+

Goals for Stage 3:

1. Increase glut activation in PWB positions following successful activation in NWB positions, and as always, without increasing pain in the front or inside of the hip.
2. Increase strength and endurance in WB positions to assist with walking and ADL tolerance.
3. Continue to increase ROM beyond initial precautions, using pain as your guide.
4. Initiate pool-based exercise program to assist progression of WB activities, improving neuromuscular control, and balance within LE.
5. **Microfracture patients**: DO NOT initiate this stage until released to begin weight bearing (WB) with walking by Dr. Kerns, commonly after post op week 4 to week 6.

Exercises within Stage 3: These exercises are listed easier to harder, only perform the later exercises if you can do so within the instructions & guidelines within the packet. Continue with any exercise(s) from Stage 2, if any exercise in Stage 3 is too challenging or painful. Progress into Stage 3 exercises in a pain free manner. Consult your physical therapist regarding volume and form with exercises if you feel overwhelmed or too challenged.

Continue stationary cycling with no resistance until at least 4 weeks post op for non-microfracture patients and 6 weeks for patients with microfracture. We recommend adding light resistance for 1/3 to ½ your total bike time, provided no increased hip pain, increasing via intervals a few minutes at a time. Continue to work up to 30 minutes 2x/daily. Athletes who can tolerate a longer cycling time without increased pain may do so. Begin upper body strength exercises without added strain to your hips.

Stage 3: Pool Therapy: Begin or continue walking and progressing WB, ROM, strength and balance.

Refer to Video and the Pool Therapy Protocol.

Exercises for Stage 3: ROM: Refer to Video

1. Continue with stage 2 ROM prone internal rotation exercise. Perform others if continued benefit is experienced.
2. Prone active hip external and internal rotation
3. Butterflies: see instructions
4. All 4s: cat/cows (AKA cat/camels)
5. All 4s: lateral weight shifting
6. All 4s: rocking back, keeping pelvis stable, progress to combining lateral weight shift and rocking back, see instructions for progressions

Exercises for Stage 3: Muscle Activation: Refer to Video

1. Continue with Stage 2 outer/back glut activation activities, which continues to provide benefit.
2. Prone isometric ER (AKA prone frogs, start week 4)
3. Prone hip extension (straight vs. bent knee), initiate after prone frogs become easy

Exercises for Stage 3: Core Stability: Begin 4 weeks post-operation: Refer to Video

1. All 4s: hip extension (start with active raise of surgical side only), and progress to opposite arm/leg lift only when stable. (AKA 3 point hip extension)
2. 3-point rocking back

3. Side plank and prone plank progression, and other core exercises minimizing hip flexor dominance and/or hip pain.

Exercises for Stage 3: Progressing WB with Outer/Back Glute Activation with Tall Kneel: Refer to Video

1. Tall kneel lateral weight shifts, frogs
2. Tall kneel squats
3. Tall kneel band progression: see instructions for trunk/pelvis dissociation and weight transition

Exercises for Stage 3: Progress to ½ Kneel from Tall Kneel Position: Refer to video

A. ½ kneel balance, tandem position
B. ½ kneel balance + band progression: see instructions for trunk/pelvis dissociation and weight transition.

Refer to instructions within packet in addition to the videos.

Other Exercises which can be initiated during Stage 3: Provided No Increased Hip Pain:

1. All 4s fire hydrants, progress to pelvic rotation if tolerated *(refer to instructions within this packet.)*
2. Lower body stretching program, *refer to the accompanying page within protocol*
3. Progressive core strengthening so long as hip flexor/groin aggravation is avoided.
4. Pilates reformer based core activation, while avoiding positions, which engage the hip flexors & groin.

**Increasing muscle recruitment with partial weight bearing (PWB) helps increase the endurance of the outer & back buttock area, which will translate to greater support of these areas with walking and ADLs. Hip position within the exercises is key to success. Failure to achieve appropriate positions as instructed contributes to incorrect muscle engagement. The "stance" hip should be the hip with which you identify working muscles, more than the unweighted or kicking side. Excessive use of muscles on the front of the hip with this stage will continue to support the wrong recruitment pattern, and lead to greater strain and/or pain.

PT should include, but not be limited to:

1. Continued PROM and soft tissue work as needed
2. Modalities as needed for pain and/or swelling
3. Assistance with form, progression of exercise program, including other activities within patient's ability to help transition through Stage 3
4. Pool-based strength, ROM, and proprioception
5. Core strength and stability

Criteria to move to Stage 4:

1. Able to identify and use appropriate glute musculature with all PWB exercises and differentiate between outer/back hip muscles vs. Front/inside hip muscles working, with appropriate form.
2. Transitioning off crutches without a limp, perform minimum household distances without crutches.
3. ROM at least 60% of nonsurgical side.
4. MMT: at least 4/5 strength of the surgical hip musculature.

Stage 3: Lower Body Stretching Program: Week 4-6+ Post Op

Various Options: Listed Intro Level to Greater Intensity

Perform 3-5 reps, with a 15-30 second hold, of each stretch.

1. Calf stretches: 4+ weeks

Hands on the wall: Stand in a split stance, with one foot closer to the wall and the other foot away from the wall. Gently lean into the wall with your hands, your back leg is straightened with heel on the ground. Then flex back knee to feel a stretch within different areas of your calf muscles. If microfracture, begin after 6 weeks post op.

2. Hamstring stretches: 4+ weeks

Supine: While on your back, keep one leg lying straight on the ground, lift and support the other thigh with hands placed behind your knee, and straighten this leg towards the ceiling. Another option is to lie on your back, and place the backside of one leg against the doorframe, while keeping the other leg straight on the floor.

Seated: In a chair, sit with one leg/knee straight and one flexed, with a straight back lean toward the straight leg. Option: Rotate the straight leg's hip internally and externally, while leaning forward to stretch medial and lateral hamstring muscles.

3. Quad stretch:4+ weeks

Belly Knee Bends: Lie prone, and with a hand or strap, grab your ankle, bending knee and pulling your heel to your seat, stretching the front of the thigh.

Side-Lying: Bend your top knee and grab your ankle, using a strap, or your hand. Bringing your heel to your buttock, stretching the front of the thigh.

4. Hip Flexor Stretches: 5-6+ weeks

Modified Thomas: Lying at the side of your bed, lower your thigh over the edge, while holding your other knee to your chest. Feel the stretch along the front of the downward leg.

Half Kneel Stretch: Kneel onto one knee, place the other foot forward with hip and knee bent to 90 degrees. Tip pelvis to mildly flatten low back, gently shift your weight forward, and stretch the front of the downward leg.

Belly Figure 4 Position: Lie on your belly with hip flexed and knee out to the side. Stretch will be felt around the inner and outer hip. Place a pillow beneath your pelvis to decrease stretch intensity as needed. To increase stretch intensity, contract glutes and press hip bone toward the ground.

5. Adductor Stretches: 5-6+ weeks

Butterfly: To stretch the inner thigh, start while doing this on your back. Weeks later, this can progress to a seated position, as tolerated.

Seated: Begin at the edge of a bed, with one leg straight, one knee bent and dangled off bed. Keep back straight and lean towards the bent knee, away from the straight leg to stretch your inner thigh.

Standing Lateral Lunge Motion: Lunge to one side, keeping the other leg straight. This will stretch the inner thigh of the straight leg. Your pelvis can be moved forward and back to change the location or intensity of the stretch.

6. Buttock Stretch: 5-6+ weeks

Figure 4 Stretch: Lie on your back with your knees bent. Cross one ankle over the other knee, and allow the crossed leg to relax. Options: (a) Push the knee of the crossed leg down or away from your trunk. (b) Pull the knee of the crossed leg up toward the opposite shoulder. (c) From the start position, bring the knee of the down leg up to your chest, if your crossed leg has enough mobility to perform.

Belly Figure 4 Stretch: Begin 7-8+ weeks. Lie on your belly with your knee bent, and raise it to the side until that foot reaches the inside of the straight knee. Place a towel roll under your hip of the bent knee to help support and

lessen pain. Tighten your buttock to press the hip bone of the bent knee toward the floor, providing a local stretch to the front of the hip joint. Hold 5 seconds, repeat 8-10x.

7. Trunk stretches: 6+ weeks

Trunk Rotations: Lie on your back with feet flat and knees bent. Rotate knees side to side within a pain-free range, to stretch lower back region.

Open Books: Begin by lying on your side with knees bent higher than a traditional fetal position, and both arms straight out in front of you. Raise your top arm toward the ceiling. Then rotate your trunk to help place your top arm directly behind you to create a "T" formation with your arms. This will stretch your thoracic spine and the front of your shoulders.

Stage 4: Initial to Progressive Strengthening:

Improving WB status/tolerance: Post op Weeks 5-6+

By the time you reach the stage of strengthening where you are on your feet, you may finally feel as if you are "back in the game." As patients reach this phase, it is common to alternate days of exercises in this stage and those from previous stages. As the WB load on your hips increase with exercise, your fatigue and post soreness will also increase. Building time in for active recovery will be necessary. Activities such as, cycling and ROM/stretching, may be indicated, along with alternating days of less intense WB exercises.

Goals of stage 4:

1. Initiate FWB exercises. Begin with bilateral stance and advance to single leg exercises for stage 5.
2. Continue to activate the appropriate outer/back hip musculature in more weighted positions.
3. Identify and work towards creating bilateral lower extremity symmetry with regards to ROM and mobility control with exercises and ADLs.
4. Progress into higher level conditioning to include resisted stationary cycling, elliptical, and swimming.
5. **Microfracture patients:** DO NOT initiate this stage and later stages until you have mastered stage 3 activation and ROM activities. Progressing into this stage too quickly may contribute to increased pain, discomfort, and compensation. All progressions are based on function and ability, not timelines.

Continue to increase biking resistance without anterior pain or deep hip soreness, slowly increase workout intensity, backing off or alternating easier and harder days as you progress into and through Stage 4.

Stage 4: Pool therapy: Includes stretching, higher level proprioception and single leg strength.

Refer to Video and the Pool Therapy Protocol.

Exercises for Stage 4: ROM:

1. Continue ROM and stretching exercises to address continued deficits, including but not limited to: all 4s rocking motions, figure 4 stretching, hip flexor stretching.

Exercises for Stage 4: Progress WB and Muscle Activation:

1. Lateral weight shifts with appropriate muscle recruitment, neutral hip/pelvic position.
2. Squats: Focus on symmetry of hip hinging and depth, use posterior glutes throughout motion. Progress to more weight bearing on your surgical side before transitioning to a single leg only.
3. Monster walks, multidirectional when tolerated without aggravation or engagement of hip flexor region.
4. Ball bridges with shoulders on ball.

Exercises for Stage 4: Proprioception/Balance:

1. Tandem balance (one foot in front of the other): eyes open, eyes closed, use Thera-band for upper body motions.
2. Initiation of single leg standing balance with good pelvic control and upright trunk position.
3. Progression of single leg balance to kicking outward with your nonsurgical leg, adding light theraband resistance only when tolerated, provided outer-back glutes work more than hip flexors on your stance leg.

4. Initiate proprioceptive exercises on altered surfaces, starting with double leg stance, tandem positions, and progressing to single leg. Start with foam pads or discs.

Exercises for Stage 4: Core and other Strength Progressions:

1. Continuation of ball and core work, progressing into higher levels as tolerated. Work with your physical therapist to help incorporate core activities maximizing the lower abdominals more than your hip flexors.
2. Institute lower extremity weight machines, including single leg strengthening with low weight as tolerated, pain-free ROM.

Exercises for Stage 4: Conditioning:

1. Continue to increase your time with resistance on the stationary bike.
2. For non-microfracture patients, initiate short walks outside, up to 15-20 minutes to start, provided you experience no increased pain with ADLs involving more walking.

PT should include, but is not limited to:

1. Introducing multi-plane stability for squats and balance, when tolerated.
2. Soft tissue mobilization and/or TDN (if allowed in your state) as needed to maintain muscle activation.
3. Assistance with form and progression of exercise program, including other activities within patient's ability to transition through Stage 4.

Criteria to progress to Stage 5:

1. Ability to successfully stand on 1 leg without compensation for a minimum of 30 seconds.
2. Discontinue use of crutches without limping, with ALL ADLs.
3. Symmetry of motion and stability with squat to chair depth without assistance.
4. Ability to identify engagement of posterior and lateral glutes with minimal to no aggravation of hip flexors with higher level exercises.
5. Demonstrate 75% of ROM of nonsurgical side.

Stage 5: Progressive Strengthening/Proprioception: weeks 7-8+

Upon reaching Stage 5, there have been many hallmarks you've achieved. This stage is about improving your surgical leg's ability to work independently from your nonsurgical leg. Rest days will be necessary as you continue to progress. You now have a large repertoire of exercises from which to choose, and alternating exercises while moving through this stage is recommended to work your hips in a variety of ways.

Goals of Stage 5:

1. Initiate and progress single leg strengthening.
2. Successfully stabilize the surgical leg in standing activities, engaging appropriate muscles.
3. Demonstrate symmetry in form and duration with single leg squatting.
4. Resume all ADLs, including return to work, with minimal to no pain or deficits.
5. Complete higher level strengthening without compensation of form.
6. Return to outdoor cycling, hiking, low impact and minimal ground reaction activities.

Stage 5 Pool Therapy: Intro to Running and Higher-Level Impact

Refer to Video and the Pool Therapy Protocol.

Exercises for Stage 5: ROM:

1. Continue ROM and stretching exercises to address continued deficits, including but not limited to: all 4s rocking motions, figure 4 stretching, hip flexor stretching.

Exercises for Stage 5: Strength and Muscle Activation:

1. Single leg squat with hip hinge focus and progress to multiplane challenges with UE or LE.
1. Step-ups, in multi-plane, progressing to eccentric focus when ready.
2. Single leg hip strength in standing: multidirectional to include frontal and transverse planes.
3. Lunges: Initiate with sliding lunges first, progress to multidirectional, then add dynamic influence.
4. Progressive weight training program.
5. Dead Lifts: Double leg progression to single leg, with and without multiplane challenges with UE or LE.

Exercises for Stage 5: Proprioception/Balance:

1. Progressive proprioceptive program including, but not limited to: balance boards, pads, balance discs, BOSU with static and dynamic strengthening. Identify appropriate challenges with your physical therapist.

Exercises for Stage 5: Core Stability:

1. Progressive core strengthening program, including Pilates, higher level swiss ball exercises.
2. Reintroduction to basic yoga for stabilization focus, if patient has had a successful yoga history, only within pain-free motions.

Exercises for Stage 5: Conditioning and Introduction to Impact:

Timeline recommendations for conditioning activities are for non-microfracture patients. A minimum of an additional 4-6 weeks is advised for patients with microfracture to initiate these activities beyond cycling.

1. Bike with resistance, monitor the reaction of your hip after. Progress to inside spin class, then outside, using pain or soreness as your guide for time and intensity.
2. Initiate elliptical trainer with 5-8 minutes to begin, progress time up to 1-2 minutes/session every 2-3 days provided no hip pain results. Recommend initiating at 8+ weeks minimum.
3. Intro to hiking (with or without trekking poles-consult PT), Recommend initiating at 10+ weeks minimum. Begin with shorter distances with maximum average incline of 2-3%.
4. Slide board for conditioning and lateral stability, with your physical therapist.
5. Initiate double leg PWB impact activities when pain-free and tolerated. Consider pool or gravity trainer and progressing to FWB bilateral impact, as strength allows. Recommended land-based impact at a minimum 10-12+ weeks.

PT should include, but is not limited to:

1. Soft tissue and joint mobilization, as needed, to address stiffness around the hip.
2. TDN to help with any continued trigger points or muscle activation, as your state allows PT to perform.
3. Assistance with form and progression of exercise program, including other activities within patient's ability. Transition to higher level, independent strengthening and conditioning.

Criteria to progress to Stage 6:

1. Successfully complete functional testing in which the surgical side demonstrates 85-90% of form and function compared to non-surgical side. Testing will include but is not limited to: Y balance, step down test, and symmetry with squat testing, such as Vail Sport Test.
2. No pain with higher level single leg activities with both legs, including with intro to impact activities.
3. Pain-free ADLs.
4. Successful introduction to walking and/or hiking program painfree.
5. ROM 90% of non-surgical side.

Stage 6: Introduction to Return to Running: 3+ months

The timing of the transition from Stage 5 to 6 is very different for all patients. The key to introducing stage 6, is successfully identifying when the patient has enough strength and stability to withstand the additional ground reaction forces within the hip and pelvis complex. Without this proper identification, the patient is at risk for further soft tissue injuries due to insufficient stability and appropriate biomechanical form. It is important to remember that the longer you were unable to run prior to your surgery, the longer it will take to return to a successful running program following your surgery. In addition, patients with microfracture will likely not be encouraged to return to a running program until 4.5 to 6 months post-operative. Due to the increased duration of post-operative NWB status and cartilage healing, more time is required for strengthening before returning to a running program, safely.

Goals for Stage 6:

1. Successfully complete functional sport testing to determine when return to sport is indicated.
2. Return to running, addressing any biomechanical deficits noted by therapist or coach.
3. Prepare for transition into sport specificity beyond running.

Stage 6 Pool Therapy: Progressive Single Leg Impact

Refer to Video and Pool Therapy Protocol.

Maintenance Activities for Stage 6:

Refer to Return to Running Protocol at www.cuhipclinic.com :

1. Continue maintenance program for lateral/posterior hip strengthening.
2. Continue stretching program: Particularly all 4s rocking motion to each side, hip flexor stretching and figure four stretching on your back and/or belly.

Higher Level Activities for Stage 6:

3. Successful ability to participate in walking program, light hiking without aggravation.
4. Ladder drills.
5. Progressive bounding activities, including multi-plane movements. Address motor control within ranges.
6. Pool activities for higher level bounding & jumping
7. Jump training to include single leg and multi-plane movements.
8. Pool running, against resistance if applicable.
9. Introduction to Alter G (if available) for PWB return to running. Progress to full weight bearing running.

PT should include, but is not limited to:

1. Instruction and supervision of any dynamic strength, stability, and bounding activities.
2. Soft tissue mobilization & joint mobilization as needed.
3. Identify weaknesses with functional sport testing prior to moving into sport specific training.
4. Assist with transition into higher-level sport activities to include: multi-plane movements, cutting, pivoting and jumping.
5. Assessing single jump/hop tests to identify insufficiencies, reassessing functional strength testing as needed.

Training for athletic pursuits is dependent upon success of the above activities. If you have pain or challenges with your running program, your return to sport may be delayed. Hip girdle musculature utilization MUST be demonstrated when landing and changing directions. Too often thigh dominance monopolizes advanced sport activity. Work with your physical therapist, certified athletic trainer, or strength & conditioning specialist during this stage to reinforce improved mechanics you have addressed throughout your rehab.

When returning to higher level activities, a maintenance program consisting of hip flexor and figure 4 stretching, all 4s motion, and outer/back glute activation/strengthening is absolutely essential for ongoing success. It is very easy for your body to resort to old habits you had prior to surgery and use muscles inappropriately.

Exercise Index
For Stages 1-3

Stage 1 Exercises: Post Op 2-4+ day

Stage 1 Initial Mobility/ROM: Refer to Video

1. Reverse Butterflies:

Lie on your back with your knees bent, feet flat, and knees hip width apart.

Rotate your knees together to midline; progress to rotating your surgical knee toward the nonsurgical knee while it stays stationary.

15-20 reps, 3x/day.

2. Pelvic Tilts:

Lie on your back, knees bent, and feet flat.

Using your lower abdominals, contract to flatten your back to the ground.

Reverse, and mildly arch your back off the ground. If arching increases any low back pain, return only to the start position and don't excessively arch.

Repeat back and forth.

15-20x, 3x/day.

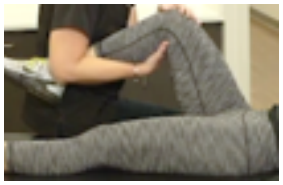
3. Ankle Pumps:

Lie on your back or in a sitting position.

Move your ankle up and down with your knee bent and straight.

1-2 sets with your knee in each position, 3x/day.

4. Passive Hip Flexion: Perform if stationary cycling is not available.



Lie on your back. A family member gently holds your lower leg and knee in their hands. As you relax, they will passively move your knee toward your chest as tolerated, or up to approximately 70 degrees. Initiate this the night of surgery, if possible, to help with drainage and circulation of the surgical hip.

Up to 2 minutes, 3-5x/day.

Stage 1 Muscle Activation/Isometrics: Refer to Video

1. Quad Sets:

Lie on your back with your leg straight.

Tighten the muscle on the front of your thigh. Imagine pushing your knee down, as you try to lift your heel off the ground. Keep the thigh on the ground throughout.

Hold 5 seconds.

15-20 reps, 3x/day.

2. Short Arc Extensions:

Lie on your back with either a towel roll or foam roller under your knee.

Straighten your knee and leg while flexing your toes toward you.

Feel the quad muscle fire, all the way to the knee.

Hold 5 seconds.

15-20 reps, 3x/day.

3. Hamstring/Glute Isometrics:

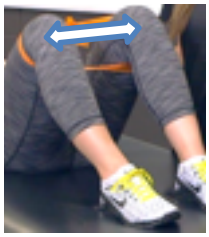
Lie on your back with either a ball, foam roller, or towel roll under your knee.

Press the back of your thigh into the ball or roller, using your butt and hamstring muscles.

Hold 5 seconds.

15-20 reps, 3x/day.

4. Hook Lying Hip Abduction/Isometric Butterfly to Neutral:



Lie on your back with your knees bent, feet flat.

Use a long Thera-band, loop it behind your knees and criss-cross it in front of your thighs, holding onto the band with your hands.

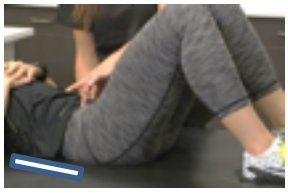
Rotate your thighs into the band until your knees are in line with your hips, feeling your outer hip muscles working.

Hold 5 seconds.

15-20 reps, 3x/day.

Stage 1 Core Activation: Refer to Video

1. Transverse Abdominus Isometrics:



Lie on your back, with knees bent, and feet flat.

Starting with your pelvic floor, maintain the small arch to your low back while you pull your lower abdominals toward your spine. DO NOT FLATTEN YOUR BACK.

Breathe while you hold this contraction, “preserve the curve in your low back.”

Hold 10 seconds. Increase the hold duration as you become stronger.

15-20 reps, 3x/day.

2. Samurais:

Lie on your back, knees bent, with the ball on your belly between your arms and knees. Press the entirety of both arms into the ball. Engage your core. Hold 5-10 seconds.

PROGRESSION: Keep one arm engaged against the ball while you raise the other arm overhead keeping your core engaged. Maintain a stable back and pelvis.

10 reps, 2-3 sets, 1-2x/day.

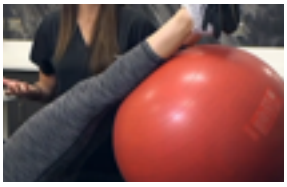
Stage 2: ROM and Muscle Activation: Post op Week 2+

Stage 2 activity goals:

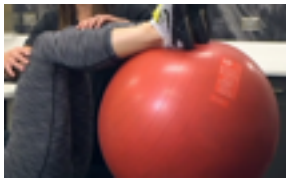
1. Begin these when you are successful with the first level of exercises.
2. Work within range of motion precautions that may still exist.
3. Focus on the various muscles in your core and glute region, to activate these muscles when performing weighted exercises in the future.
4. Be able to identify specific muscles, approximately the size of your palm, being activated in the buttock region. If you feel an area deep in your buttock, the size of your thumb pad, you are NOT engaging the optimal musculature while performing the exercise.
5. There ought to be minimal sensation within the anterior or groin of your hip, as exercises focus on moving your hip separately from your pelvis & trunk.

Stage 2 ROM Exercises: Refer to Video

1.Supine Hip Flexion with Feet on Ball:



Lying on your back, place feet on top of a ball. Keeping your core engaged, gently pull your knees toward your chest with heels on the ball and buttocks on the ground.



Pull your knees so they are perpendicular to the ground (less than 4 weeks post op). Increase your hip flexion after 4 weeks post op, unless otherwise advised by Dr. Kerns.

15-20x, 3x/day.

2.Prone Terminal Knee Extension: (week 3)

Lie on your belly.

Keep lower abdominals engaged. OR with hands under your chin, lightly press your forearms into the floor to engage the core.

Place top of foot over foam roller (or press toes into the floor if foam roller is not available).

Tighten quad muscle to actively lift your knee off floor. Perform primarily on your surgical side.

Hold 5 seconds.

15x, 3x/day.

3. Prone Active Knee Flex: (week 3)

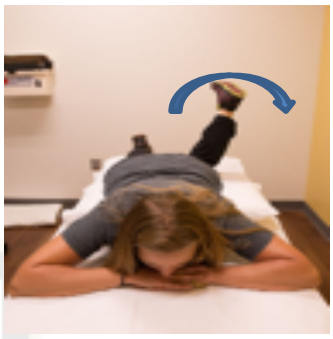
Lie on your belly.

Keep lower abdominals engaged. OR with hands under your chin, lightly press your forearms into the floor to engage the core.

Bend your knee so your heel comes up to your butt, control down.

15-20x, 3x/day

4.Prone Active Internal Hip Rotation: (Week 3)



Lie on your belly.

Keep lower abdominals/core engaged. OR with hands under your chin, lightly press your forearms into the floor to engage the core.

Bend your knee to approximately 90 degrees.

Rotate your lower leg out while keeping your pelvis stable.

Return your leg to the upright position.

Option: Perform with both legs at the same time so you start and end with your feet together, minimizing potential external rotation.

15-20x, 3x/day.

Stage 2: Muscle Activation: Refer to Video

1.Standing Hip Abduction:

Stand on level ground or a small step with your nonsurgical leg.

Kick outward with your surgical leg, with a straight knee, and leading with the outside of your heel.

Use the outside glutes on your surgical side while kicking, and the stance side for stability.

15-20 reps, 3x/day

2. Bridges:

Lie on your back, knees bent, feet flat.

Squeeze buttocks together, then lift your seat off the ground, maintaining alignment of shoulders, pelvis and knees.

To reduce hamstring dominance, position feet closer to your seat.

Slowly lower down.

1-2x10 reps, 3x/day.

ADDITIONAL OPTIONS:

1. Add resistance band around knees to help engage the outer glutes while bridging up and down.
2. With a band around your knees, hold the up position and push outward against the band while controlling the inward motion.
3. Single leg bridges: hold one knee up in the air, or cross one ankle over the other knee, and perform a bridge.

3. Prone Isometric Hip IR: (week 3+)

Lie on your belly with a band around your ankles.

Knees bent to 90 degrees, Keep lower abdominals/core engaged. OR with hands under your chin, lightly press your forearms into the floor to engage them.

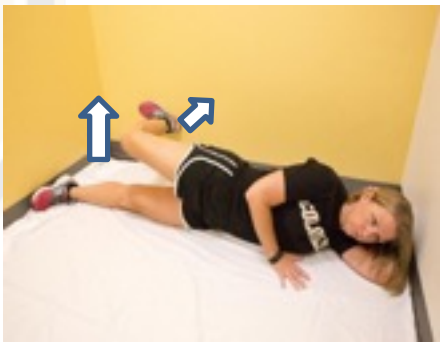
Rotate your lower legs into the band using your outer hips.

Hold 5 seconds.

15-20x, 3x/day.

OPTION: Hold one leg and move the other while keeping your core engaged.

4. Modified Clamshells: **Preferred for outer glute activation: (week 3+)**



Lie on your side, bottom knee bent or straight, top knee/thigh in line with your body, foot against the wall.

- Engage through your back glutes and push your foot into the wall.
- With a minimal movement, raise your top knee up and down using your lateral glute to initiate the motion.
- Raise your knee in line with your foot and hip until 4 weeks post op for a neutral position. After 4 weeks post op, you may lift the knee into a greater motion, as tolerated.

15-20 reps, 3x/day. *ALTERNATIVE:* If you experience greater activation while holding the top of the position, hold 5-10 seconds, 1-2 sets of 8-10 reps, 2-3x/day.

PROGRESSION: Add a band loop around your knees for greater resistance while maintaining form.

4a. Clamshells: <u>alternative</u> for outer glute activation, provided no front hip pain (week 3+)

Lie on your side, knees bent. Engage lower abdominals.

Maintain alignment of your feet, butt, shoulders, and head, as if you are lying against the wall.

Using your outer glutes, raise your top knee toward the ceiling.

Raise your knee in line with your hip until 4 weeks post op. After 4 weeks post op, only as high as possible, without rotating your pelvis backwards.

15--20x, 3x/day.

Stage 2: Core Activation:

Continue with stage 1 activation exercises, progressing the samurai to include arm movements. Increase repetitions as tolerated.

Stage 2: Later Options for Muscle Activation/Core Stability: Week 3-4+

***Especially helpful for patients with microfracture and WB limitations.

1. Side-Lying Hip Abduction, progress to 3-way hip sequence motions:

***Hip Abduction:**

Keep bottom leg bent and top knee straight.

Begin with your top thigh parallel to the ground.

Align the top leg and shoulder with your trunk, or slightly behind your trunk.

Raise your leg up and down from this position.

Engage the lateral glute to raise the leg, more than the muscles on the front and outside of hip.

Maintain engaged lower abdominals.

10 reps, 2-3 sets, 2-3x/day.

Progression: Hip Abduction/Hip Kicks/Hip Rotation Sequence

***Hip Kicks:**

Keep bottom leg bent and top knee straight.

Begin with your top thigh parallel to the ground.

Maintaining the parallel position, kick forward until your top thigh is even with your bottom thigh, return to starting point, and extend beyond the plane of your body using your hip, not your back.

Use your outer butt to perform the motion.

Keep core engaged.

10 reps, 2-3 sets, 2-3x/day.

***Hip Long Axis Rotation:**

Keep bottom leg bent and top knee straight.

Keeping your top leg parallel to the ground, rotate your whole leg from the hip upwards toward the ceiling then down to the floor. Repeat. Maintain a stationary pelvis. The motion will be small.

Use your outer butt to perform the motion.

Keep your lower abdominals engaged.

10 reps, 2-3 sets, 2-3x/day.

2. Ball Exercises:

***Straight Leg Bridges:**

Lie on your back with your feet or lower legs on top of ball.

Push downward onto the ball, with the backs of your legs, engaging your buttocks to raise your seat upwards. Your back muscles should support the work in your legs, not dominate the activity.

No hold, 2-3x10 reps. 1x/day.

PROGRESSION: Bent knee bridges: Bend both knees and hips to 90 degrees. Place heels on top of the ball, dig your heels downward to lift your seat in the air primarily using your hamstring muscles. 2-3 x10 reps, 1x/day.

PROGRESSION: Bridge + Hamstring Curl: With straight leg bridge form, lift seat upwards, hold hips up, bend your knees and curl the ball towards you. 2-3x10 reps, 1x/day.

***Prone Over Ball + Leg Lift:**

Lie over the ball with equal weight between all 4 extremities on the ground.

Engage your core and lift one leg at a time, so your thigh is in line with your torso. Leg lift is primarily initiated from the posterior buttock muscle and not the hamstring. Alternate sides.

Hold 2-3 seconds with each lift.

2-3x10 reps each side. 1x/day.

PROGRESSION: Opposite Arm and Leg Lift: Raise the opposite arm and leg, until even with the body. Engage your core to maintain balance.

2-3x10 reps. 1x/day.

***90-90 Pushes Supine: (perform when WB exercise can be initiated)**

Lie on your back, with a foot on a ball, knee and hip each, at 90 degrees. The other leg is to remain straight on the ground.

Engage your core.

Using thigh and glute muscles, press your foot into the ball against the wall.

Force generated should be challenging, but not painful. The ball will likely shake.

Hold 5 seconds.

10 reps, 1-2 sets, 2-3x/day.

PROGRESSION: Side-Lying 90-90 Pushes: Lie on your side, top knee & hip bent to 90 degrees, and foot on the ball. The ball will be 3-4" off the ground. With your foot & knee in line with your hip, be sure to see your toes beyond the end of your knee cap. Keep your top knee from rotating downward by using your outer glute, as you push your foot into the ball & against the wall.

Hold 5-10 seconds, 1-2x10 reps. 1-2x/day.

***Bent Knee Fall Outs:**

Lie on your back, with one knee bent, and the other straight.

Rotate the bent knee leg outward, with control.

Engage your core and stabilize your pelvis.

Control the pelvis as you rotate your knee back to the starting position.

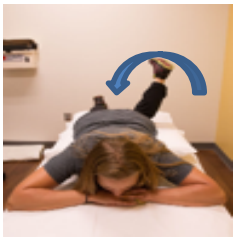
No hold

10 reps, 2-3 sets. 1-2x/day.

Stage 3: Muscle activation and Weight Bearing Transition: Post Op Week 4-5+:

Stage 3 ROM Exercises: Refer to Video

1. Prone Active External Hip Rotation:

Lie on your belly.

Keep lower abdominals/core engaged. OR with hands under your chin, lightly press your forearms into the floor to facilitate core activation.

Bend your knee to approximately 90 degrees.

Rotate your lower leg in/out maintaining a stable pelvis. This is a progression from internal rotation only during stage 2.

15-20x, 3x/day.

2. Supine Butterflies:


Lie on your back, knees bent and feet flat on the ground.

Rotate your knees outward, like a butterfly motion, to increase hip external rotation.

Performing this range may produce soreness, but do NOT push through pain.

Hold for 5 seconds.

15-20x, 3x/day. **Option:* To facilitate the motion, add a very light band around the outside of your thighs to push against. Adding this light resistance may reduce pain within the adductor region.

4 Point/All 4s: Start Position: For each exercise, the knees are directly under hips, and hands under shoulders. This position reduces hip flexor engagement.

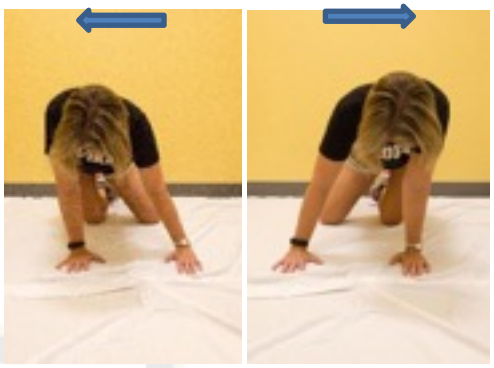
3. All 4s: Cat Cow:


While on your hands and knees, arch your back toward the ceiling, and arch your belly toward the ground.

Hold 5 seconds per direction.

10-20x, 2-3x/day.

4. All 4s: Lateral Weight Shifting:



Assume start position. Minimal tension is to be felt in the hip flexors.

While keeping your pelvis parallel to the ground, shift your weight to the side, feeling your weight on the outside of one knee/ hand, and the inside of the other knee/hand

Goal: Increasing ROM and lateral glute activation in PWB position. A slight pinch may be experienced, work as tolerated.

Minimize a "wag" of your buttock.

Hold 5 seconds, then shift to other side.

10-20x, 3x/day.

5. All 4s: Rocking Back:

Assume start position and engage abdominals. To increase hip ROM, transition your weight towards your heels, engaging glutes to assist with the motion. Maintain pelvis stability, while the motion originates through the hips.

Work ROM as tolerated, avoid creating a sharp pinching sensation.

Goal: Increase ROM and posterior glute activation in PWB position.

Hold 5 seconds.

10-20x, 3x/day.

PROGRESSION: Combine the lateral weight shifts with sitting back towards one foot at a time to increase hip ROM. Perform only within a pain-free range.

Goal: Increasing ROM and posterior/lateral glute activation.

Stage 3 Muscle Activation: Refer to Video

1. Prone Isometric ER (AKA Prone Frogs):

Lie on your belly, knees bent to 90 degrees or more, positioned wider than your hips, and feet placed together. Keep lower abdominals/core engaged OR with hands under your chin, lightly press your forearms into the floor to engage the core.

Press feet together by squeezing your buttocks together. Press hip & pelvis toward the floor. To support your back, place a pillow under your hips. Keep your thighs on

the floor the entire time you engage your buttocks.

Hold 5 seconds. 15-20 reps, 3x/day

2. Prone Hip Extension:

Lie on your belly, with or without a pillow under your pelvis. Engage lower abdominals. OR with hands under your chin, lightly press your forearms into the floor to activate core.

Focus on using your glute more than your posterior thigh or low back, and lift your leg off the ground.

15-20 reps, 3x/day

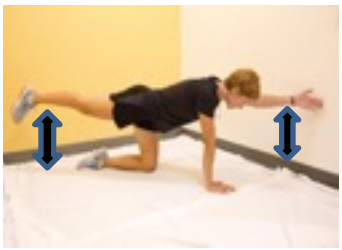
OPTIONS: Perform with a bent or straight knee, whichever position engages the buttock more than your back or thigh.

Stage 3 Core Stability: Refer to video

1. All 4s Hip Extension:

Assume start position and activate abdominals. Glute muscles should be engaged more than anterior hip musculature especially on the down leg during these exercises.

- Raise one leg back, with a straight or bent knee, maintaining core activation and level pelvis.
- Raise opposite arm & leg while keeping your core stable and pelvis level.



Progression: Raise opposite arm and/or leg, and while in extension, move each limb *out to the side,* challenging core stability.

OPTIONAL PROGRESSION: Holding a band in each hand, loop band on your kick foot, and kick back vs. the resistance.

2. 3 Point Rocking Back:

Assume start position of all 4s, then raise and hold one leg in the air.

Rock backwards toward your heel, as far as possible, glutes activated, and maintaining a level pelvis.

Return to position where glutes activate more than hip flexors.

Depth is within a pain-free range. Strive for symmetry between both legs. Do not continue if you experience pain.

OPTION: Support raised leg on a small ball to assist the motion, making it easier.

This exercise is a precursor to assist hip hinging exercises on your feet.

20. eps, 1-2x/day.

3. Knee Side Planks:

Lie on your side, elbow directly under your shoulder. Keep knees, hips, and shoulders in line with your body.

Raise your pelvis, pressing through the outside of your knee, activating lateral core and hip muscles.

Keep your pelvis, trunk and lower body all in line. Squeeze your buttocks to keep pelvis in line with body.

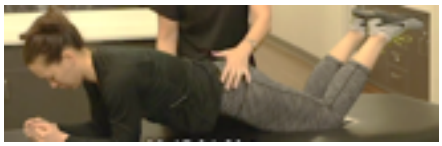
Hold 5-10 seconds, and build up your time as tolerated.

10 reps, 2-3x/day.

PROGRESSION: Side Planks at Feet: Straighten your legs. Your feet, knees, hips and shoulders remain in line with your torso. Push through the outside of your feet, raise your hips, and place top hand on your hip.

ADDITIONAL OPTIONS: Add clamshell motion from knee or foot position. Or add 3-way hip sequence option for higher core involvement.

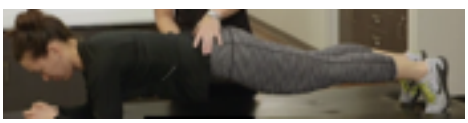
4. Prone Planks:



Start with knees on the ground, elbows directly beneath shoulders, with hands separated. Lift belly off the ground so that your shoulder, hips, and knees are in line. Activate lower abdominals to stabilize position.

Hold 10-15 seconds. Gradually increase duration.

10-15 reps.



PROGRESSION: Planks on Feet: Increase challenge to core. Keep hands separated, and hips in line with legs and shoulders. Focus on abdominal contraction to support your back.

Stage 3: Progressing WB with Outer/Back Glute Activation: Refer to Video

Goals of these exercises:

1. Initiate partially weighted exercises, focusing on hip musculature engagement.
2. Increase the ability to move with added weight through your hips.
3. Start identifying asymmetries between your hips, and minimize these deficits.

1. Tall Kneel w/ Lateral Weight Shifts:

Begin kneeling with hips, shoulders, and knees in alignment.

Shift your weight to one side, then the other. Keep hips in line with your shoulders and trunk. Hold pelvis level.

Weight on your knees will shift from the inside of one knee and outside of the other knee, then reverse. When shifting to the right, the inside of your right knee will be even with the midline of your body, and vice versa when you shift to the left.

Relearning this weight shift will assist with normalizing upright walking.

Hold for 3-5 seconds, keeping your pelvis level, shoulders stable. Avoid tipping as you shift weight.

20-30x. 2-3x/day.

2. Tall Kneel + Frogs: (optional to help increase glute engagement)

Begin kneeling with knees, hips, and shoulders in alignment.

Bring feet together and place knees, hip width apart.

Squeeze butt muscles to open and push your hips forward.

This is a progression of the exercise on your belly and will assist both lateral weight shifts and tall kneel squats.

Keep core engaged to minimize low back extension.

Hold 5 seconds; 20x, 2-3x/day

3. Tall Kneel + Squats:

Begin kneeling with knees, hips, and shoulders in alignment. Raise arms in front, or hold onto something to assist with balance.

Hinge at your hips, moving sit bones towards heels. Stay within a painfree range.

Hip and thigh muscle engagement will be felt. Minimize quad dominance.

Return to the tall kneel position. Squeeze buttocks throughout entire range and into hip extension, if possible.

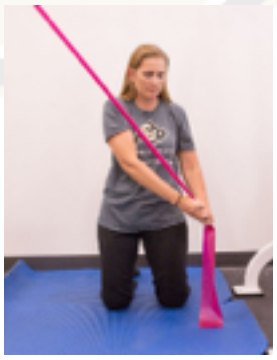
20x, 2-3x/day.

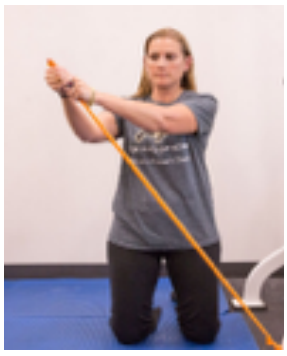
4. Tall Kneeling Variations: For progressing muscle recruitment within surgical hip:

Kneeling with your knees, hips, shoulders in alignment. Engage core and glute muscles.

a. **One Arm Flies:** The hip closest to band attachment optimally has more muscle activation. Move the outside arm, as trunk and pelvis stay in line. Maintain neutral hip extension and pelvis level beneath shoulders. 2x10; 1x/day.

b. **Trunk Rotations**: Keep pelvis stable, control band movement and rotate your trunk & both arms to the outside. Progression includes: Twisting trunk up and out, lifting upwards. Or down and out, chopping downwards. 2x10; 1x/day.





Stage 3: Progressing WB to ½ Kneel with Outer/Back Glute Activation: Refer to Video

Half Kneel Position: Progression of Tall Kneel Position:

Only perform the Half Knee Exercises, IF on the stance leg, outer and back glute muscles are the primary stabilizers. If quadriceps activation dominates, hold off until the appropriate muscles engage in this position.

Place one foot on the ground in front so one knee is up, and one knee is down. The goal is to have your foot and knee in the same line.

The downward leg is to maintain alignment with hips and shoulders. Contract glute muscles while keeping your core engaged. Center your body weight at the top of your lower leg bone, on the floor.

Maintain approximately 90 degrees in the knee and hip of the forward leg.

1. Half Kneel Balance, tandem position:

Perform with eyes open.

Progress to eyes closed or eyes open with the addition of moving head around, while maintaining balance.

Hold 30 seconds, 3-5 reps, 1-2x/day.

2. Half Kneel Balance Progressions:

a. **One Arm Flies:** Pull outward with opposite arm of the downward leg. Focus on pelvic stability, as you increase weight and glute engagement onto the down leg. 2x10; 1x/day.

b. **Trunk Rotations:** Progress by adding lift ups and chop downs with trunk and pelvis dissociation, as previously noted in Tall Kneeling activities. The more challenging method to perform the exercise is to have your front foot in line with the back knee. If you are too unstable in this position, mildly widen stance. 2x10; 1x/day.

Stage 3: Other Progressive Exercises to Increase PWB and Activation:

1. All 4s Fire Hydrants:

Assume start position.

Raise one knee out to the side, engaging the lateral glute muscles on both

the moving leg and stance leg.

Keep stance hip at 90 degrees or greater flexion.

Raise leg only as high as you can, without compromising pelvic stability.

No hold needed. *OPTION*: Add a resistance band at knees.

10-20 reps, 1-2x/day.

2. 3 Point Pelvic Rotation:

Begin on all 4s, with hips and shoulders at 90 degrees.

Extend one leg behind you. Preserve 90 degrees or more at the stance hip during this exercise.

Contract outer glute muscles. Then, rotate the anterior hip of extended leg away from the ground, then towards the ground.

The glute muscles must be primary movers and stabilizers. If back muscles are the prime movers during this exercise, discontinue until glutes become stronger.

This exercise is a precursor to assist hip hinging exercises on your feet.

No hold. 10-20x, 1-2x/day