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Post Operative Hip Arthroscopy Procedure Form

Femoracetabular Impingement (FAI)

Femoral Osteochondroplasty Acetabular Rim Trimming

Acetabular Labrum

Repair Debridement
Location: ___ o'clock to ___ o'clock

Articular Cartilage

Microfracture - Femur Acetabulum

Capsular Modification

Plication/Repair Capsular release

Extra-Articular Soft Tissue Procedures

Partial Iliopsoas release ITB Release

Peritrochanteric Space

Bursectomy Gluteus Medius/minimus repair

Deep Gluteal Space

Release or Debridement

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Post Operative Hip Arthroscopy Rehabilitation Protocol for Dr. Shane Nho

Labral Repair with or without FAI Component

Initial Joint Protection Guidelines- (P.O. Day 1-4 wks):

- **Joint Protection Patient education**
  - Avoid at all times actively lifting or flexing and rotating hip (thigh) for 2-3 weeks
  - Assistance from a family member/care taker is important for transitioning positions for the 1st week after surgery
  - Do not sit in a chair or with hip bent to 90 degrees for greater than 30 minutes for the first 2 weeks to avoid tightness in the front of the hip
  - Lay on stomach for 2-3 hours/ day to decrease tightness in the front of the hip (patients with low back pain may have to modify position)
- **Weight bearing restrictions**
  - FFWB x 3 weeks if no MFx
  - FFWB x 6-8 wks if MFx
  - PT to provide education on foot flat weight bearing (FFWB) with 20 lbs. of pressure
- **Continuous Passive Motion Machine**
  - Begin with machine motion set between 30 and 70 degrees and slowly increase to 0-120 degrees, progressively increasing 6-8 degrees/day
  - Use 4 hours/day (Mfx patients use 6hrs/day)
  - May decrease use by 1 hour if riding stationary bike for 20 minutes without resistance
  - May break up usage of CPM in increments throughout the day
- **Brace Use**
  - Brace ROM is set at 0 degrees extension and 90 degrees of flexion for walking
  - Brace must be locked at 0 degrees extension and 0 degrees of flexion for sleeping
  - Brace must be worn at all times the patient is up
  - Must sleep in brace
  - Take brace off when in CPM
- **Post Operative Range of motion restrictions for hip arthroscopy**
  - Flexion limited to 90 degrees x 2 wks
  - Abduction limited to 30 degrees x 2 wks
  - Internal rotation at 90 degrees flexion limited to 20 degrees x 3wks
  - External rotation at 90 degrees of flexion limited to 30 degrees x 3 wks
  - Prone internal rotation and log roll IR- no limits
  - Prone external rotation limited to 20 degrees x 3 wks
  - Prone hip extension limited to 0 degrees x 3 wks

Post Operative Physical Therapy Guideline

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- Patient to be seen 1-3x/wk for 12-16 wks.
- This protocol is written for the treating physical therapist and is not to substitute as a home exercise program for patients.
- The post operative rehabilitation is just as important as the surgery itself
  - Please take a hands on approach to the patient's care utilizing manual therapy techniques to prevent and minimize post operative scarring and tightness
  - Please emphasize form and control when instructing patients in exercise to prevent compensation and soft tissue irritation from compensatory patterns
  - The protocol serves as a guideline to patient care for the first 12-16 weeks of rehab.
  - Patients may progress through the protocol at different rates, please always use clinical decision making to guide patient care
- DO NOT PUSH THOUGH PAIN
- Please contact Philip Malloy, MS, PT, SCS or Allie Wichmann PAC with any questions regarding the post operative protocol at pmalloy@rushortho.com or awichmann@rushortho.com

Phase 1 - Rehabilitation Goals (weeks 1-6)

- Provide patient with education on initial joint protection to avoid joint and surrounding soft tissue irritation
- Begin initial passive range of motion within post operative restrictions
- Initiate muscle activation and isometrics to prevent atrophy
- Progress range of motion promoting active range of motion and stretching
- Emphasize proximal control of hip and pelvis with initial strengthening
- Initiate return to weight bearing and crutch weaning
- Normalize gait pattern and gradually increase weight bearing times for function

Phase 2 - Rehabilitation Goals (weeks 6-12)

- Return the patient to community ambulation and stair climbing without pain using a normal reciprocal gait pattern
- Continue to utilize manual techniques to promote normal muscle firing patterns and prevent soft tissue irritation
- Progress strengthening exercises from double to single leg
- Promote advanced strengthening and neuromuscular re-education focusing on distal control for complex movement patterns
- Progress the patient to phase 3 rehabilitation with appropriate control and strength for sport specific activities

Precautions for Phase 1 - Hip Arthroscopy Rehabilitation

- Avoid hip flexor tendonitis
- Avoid irritation of the TFL, glutes medius, ITB, and trochanteric bursa
- Avoid anterior capsular pain and pinching with range of motion
- Prevent low back pain and SIJ irritation from compensatory patterns
- Manage scarring around portal sites and at the anterior and lateral hip
- Do not push through pain with strengthening or range of motion

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Precautions for Phase 2 – Hip Arthroscopy Rehabilitation

- Continue to avoid soft tissue irritation and flare ups that delay progression
- Be aware of increasing activity and strengthening simultaneously to prevent compensation due to fatigue
- Promote normal movement patterns and prevent compensations with higher level strengthening
- Do not push through pain

Phase 1 - Passive Range of Motion (Week 1-6)

Circumduction – flex hip to 70 degree and knee to 90 degrees. Slowly move thigh in small circular motion clockwise. Repeat in counter clockwise direction. Avoid rotating hip into ER and IR during the motion. Perform this motion for 5 minutes in each direction.

Neutral circumduction- with knee extended slowly abduct the hip to 20 degrees. Move the leg in small circles clockwise then repeat counter clockwise. Perform 30 reps in each direction.

Supine hip flexion – slowly flex the hip with the knee bent, avoiding any pinch in the anterior hip. You may provide a caudal glide to avoid pinch at 3 wks post op. Perform 30 reps of this motion

Supine abduction- Abduct the hip maintaining the hip in neutral rotation and perform 30 reps of this motion.

Supine ER – Bring hip to 70 degrees of flexion with the knee flexed to 90 degrees. Slowly rotate the foot inward towards the other leg. Perform 30 reps of this motion.

Supine IR- Bring the hip to 70 degrees of flexion with the knee flexed to 90 degrees. Slowly rotate the foot outward. Avoid any pinch in the groin or back of hip. Perform 30 reps of this motion.

Side lying Flexion- Have patient lie on uninvolved side. Support the leg by holding it above and below the knee. Slowly flex the knee towards the chest maintaining the hip in neutral rotation. Perform 30 reps of this motion.

Prone IR- In prone position, flex patients knee to 90 degrees and slowly move the foot to the outside. Perform 30 reps of this motion.

Prone ER- In prone position, flex patients knee to 90 degrees and slowly move the foot to the inside towards back of other knee. Avoid anterior hip pain. Perform 30 reps of this motion.

Prone extension- In prone, flex the patients knee to 90 degrees. Grasp the anterior aspect of the patient's knee. Stabilize pelvis with opposite hand and slowly extend the hip. Perform 30 reps of this motion.

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Prone on elbows or press ups- Have the patient lie prone and slowly extend the lumbar spine by propping on their elbows. The patient may progress to prone press-ups as tolerated to stretch the hip flexors. Perform 2 sets of 10 repetitions.

Quadruped rocking- The patient assumes a hands and knees position. Keeping pelvis level and back flat, slowly rock forward and backwards from hands back to knees. Once the range of motions restrictions are lifted, the patient may begin to rock backward bringing buttock to heels stretching the posterior hip capsule. Perform 2 sets of 30 repetitions.

Half kneeling pelvic tilts- The patients assumes a half kneeling position bearing weight through the involved leg. The patient slowly performs a posterior pelvic tilt gently stretching the front of the hip. Perform 2 sets of 20 repetitions.

Phase 1 and 2 - Manual Therapy Treatment Progressions (Week 1-12)

Phase 1

- Scar massage x 5 minutes
  - Incision portals – begin post op day 2 – wk 3
- Soft tissue mobilization x 20 – 30 minutes
  - Begin Post op day 4 – wk 10-12
  - Begin with superficial techniques to target superficial fascia initially
  - Progress depth of soft tissue mobilization using techniques such as deep tissue massage, effleurage, pettrissage, strumming, perpendicular deformation, and release techniques
  - The use of mobilization with active and passive movement in very effective with this patient population (ART, functional mobilization etc.)
  - Anterior
    - Hip flexors (Psoas, Iliacus, and Iliopsoas tendon)
    - TFL
    - Rectus femoris
    - Inguinal ligament
    - Sartorius
  - Lateral
    - ITB
    - Gluteus medius (all fibers, especially anterior)
    - Iliac crest and ASIS
    - Quadratus lumborum
  - Medial
    - Adductor group
    - Medial hamstrings
    - Pelvic floor
  - Posterior
    - Piriformis
    - Glutes medius/minimus/maximus

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- Deep hip ER's (gemellus, quadratus femoris, and obturator internus)
- Proximal hamstrings
- Sacral sulcus/PSIS/SIJ
- Erector spinae
- Quadratus lumborum

❖ Joint Mobilizations (3-12 weeks)
  - Begin with gentle oscillations for pain grade 1-2
  - Caudal glide during flexion may begin week 3 and assist with minimizing pinching during range of motion
  - Begin posterior glides/inferior glides at week 4 to decrease posterior capsule tightness (may use belt mobilizations in supine and side lying)
  - Do not stress anterior capsule for 6 weeks post op with joint mobilizations

Phase 2 – weeks 6-12

❖ Continue to utilize manual therapy including soft tissue and joint mobilizations to treat patient specific range of motion limitations and joint tightness.
❖ Soft tissue mobilization should be continued to address continued to complaints of soft tissue stiffness at surgical sites especially for pinching in anterior hip
❖ Address any lumbar or pelvic dysfunction utilizing manual therapy when indicate

Phase 1 and 2 – Muscle activation, neuromuscular re-education, and strengthening (wks 1-12)

Isometrics – Post Op day 1- day 7

Gluteal sets- Have the patient lie on back or stomach and gently squeeze buttocks. Hold for 5-10 seconds and repeat 30 times

Quad sets- Have the patient lie on back or stomach and gently tighten the muscle on the front of your thighs. Hold for 5-10 seconds and repeat 30 times.

TA isometrics with diaphragmatic breathing- Have the patient lie on back and place fingers 2 inches inside of pelvic bones on lower abdomen at waist- band. Instruct the patient to gently draw in until you feel tension under your fingers. You also may perform a kegal exercise prior to contraction. If you feel a bulge of stomach muscles and your fingers being pressed away you are squeezing to hard. Do not hold breath during contraction. Hold contraction for 5 slow breaths, relax, and repeat 30 times.

Muscle activation, neuromuscular re-education and strengthening– Post Op Weeks 2-12

Supine Progression

Supine hook lying hip internal and external rotation

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- **Internal rotation-** Have the patient assume hook-lying position with feet shoulder width apart slowly bring knees together and return back to neutral. Maintain a level pelvis throughout the motions. Repeat 30 times.

- **External rotation –** Assume hook-lying position and slowly rotate knees outward within the mid range of motion. Maintain a level pelvis throughout the motions. Repeat 30 times.

Pelvic clocks (12-6, 9-3, and diagonals)- Have patient assume a supine position with a bolster under the knees. The patient is instructed that they are lying on a clock face with 12 o clock being caudal and 6 being cephalad. Slowly move pelvis, so that the sacrum touches each number of the clock and returns to neutral. Perform clockwise and counterclockwise movements. Perform 10 repetitions each direction. Repeat 2-3 times/day.

Supine lower trunk rotations- Have patient assume a hook-lying position. Instruct the patient to slowly rotate their legs side to side. Initiate motion at hip joint and continue until pelvis and lumbar spine are off the bed. Rotate 30 times to each side. Repeat 2-3 times/day.

TA isometric with bent knee fall outs- Have patient lie supine with one knee flexed to 90 degrees and hip at 45 degrees and the other leg extended. Slowly rotate knee out to the side, maintaining a level pelvis and TA engaged. Perform 15 reps and repeat 2 sets both sides.

TA isometrics with marching- Have patient lie in hook-lying position. Perform a TA isometric maintaining a level pelvis. Slowly raise one foot off the support surface not moving the pelvis and isolating movement at the hip joint only. Repeat with the other leg on a marching type motion. Repeat 10-15 times with each leg and perform 2 sets.

Supine FABER slides with TA isometric- Have the patient place the heel of the involved leg at the medial malleolus of the opposite ankle. Slowly slide the heel and foot up the leg to the knee. Slowly stretch the knee toward the table at the top into the FABER position. Maintain a level pelvis during the motion. Perform 10-15 reps and repeat 2 times.

Bridging series

- **Double leg bridging-** Have the patient assume a hook-lying position. Instruct the patient to slowly raise their pelvis off the support surface. Imagine moving one vertebrae off at a time from the sacrum to thoracic spine. Maintain a level pelvis during the entire movement. Perform 10-15 repetitions and repeat 2-3 times.

Progressions: Repeat all of the above instructions with…

- **Bridge with adduction isometric**- Place a ball or pillow between the patients knees. Have the patient slowly squeeze the knees together while they slowly raise their pelvis off the support surface. Perform 10-15 repetitions and repeat 2-3 times.

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- **Bridge with abduction-** Place a thera band or pilates ring around the outside of patient's knees. Instruct to begin by slowly press their knees into the band or ring. Perform 10-15 repetitions and repeat 2-3 times.

- **Bridge with single knee kicks-** Slowly straighten your uninvolved knee maintaining a level pelvis during the movement. Return to the double leg position and repeat with other leg. Perform 10-15 repetitions and repeat 2 times.

- **Single leg bridge-** Instruct the patient to cross their uninvolved knee over their involved knee in figure 4 position. Have the patient slowly raise their pelvis off the table keeping level at all times. Perform 10-15 repetitions and repeat 2 sets.

Side lying Progression

Side lying pelvic A/P elevation and depression- Have the patient assume a sidelying position on uninvolved side. Flex the hips to 60 and knees to 90 degrees. Have the patient slowly bring the pelvis up and forward (elevation) keeping a neutral level spine posture. Have the patient then bring the pelvis down and back continuing to maintain a neutral spine. Avoid lumbar spine side bending and flexion and extension during the motion, isolate movement at the pelvis. Perform 10 reps and repeat 2 times.

Side lying clams- Have the patient assume a side lying position on the uninvolved side. Instruct the patient to depress the pelvis down and backward. Maintaining the pelvis in this position, slowly rotate the top knee away from the bottom knee keeping the feet together and maintaining a stable and neutral spine and pelvis. Perform 15 reps and repeat 2-3 sets.

- May add a thera band for resistance or pilates ring to perform isometric clams

Side lying reverse clams- Have the patient assume a side lying position on the uninvolved side. Instruct the patient to depress the pelvis down and backward. Maintaining the pelvis in this position, slowly rotate the top foot away from the bottom foot keeping the knees together and maintaining a stable and neutral spine and pelvis. Perform 15 reps and repeat 2-3 sets.

Side plank progression

- **Half side plank taps-** Have patient assume a side lying position on involved side with knees flexed to 90 degrees and hip at 0 degrees extension in line with shoulders. The patient's bottom elbow in placed at 90 degrees directly under the bottom shoulder. Slowly push both knees into the table lifting the pelvis so its line with the shoulder, pause at the top for 3 seconds and return to the starting position. Repeat 15 times and do 2-3 sets.
- **Half side plank holds –** Same as above but the position is held from 30 seconds to 3 minutes. Repeat 1-3 times.
- **Modified side plank holds-** The patient assumes a half side plank position. The top knee is extended with the hip in neutral resting behind the bottom leg which is still flexed at 90 degrees. Slowly push the bottom knee into the table lifting the pelvis so its in line with the shoulder. The position is held for 30 seconds progressing to 3 minutes.

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- **Full side planks-** The patient assumes a side lying position the hips and knee extended and the pelvis level and spine in neutral. The bottom elbow in flexed to 90 degrees and shoulder is abducted to 90. Press the outside of the bottom foot into the table and lift the pelvis maintaining a neutral spine throughout the exercise. Hold for 30 seconds to 3 minutes as tolerated. Repeat 1-3 times.

Prone Progression:

Prone alternate knee flexion with TA isometric – Have the patient assume the prone position. Instruct the patient to perform a TA isometric maintaining a level pelvis. Slowly flex one knee at a time keeping the pelvis level and minimizing any movement during the motion with the legs. Repeat 10-15 reps with each leg and perform 2 sets.

Prone hip IR and ER – Have the patient assume a prone position with a level pelvis. Slowly rotate the involved leg into IR and ER maintaining a level pelvis and keeping the range of motion in med range. Repeat 15 reps each direction and perform 2 sets.

Prone hip extension with extended knee- Have the patient assume the prone position. Instruct the patient to perform a TA isometric to maintain a level pelvis and stable lumbar spine. Slowly have the patient extend the hip with the knee in extension using the buttock and minimizing hamstring activation during the movement. The patient should just raise the leg off the table and not move the pelvis or arch the low back during the motion. Repeat 15 times with each leg and perform 2 sets.

Prone hip extension w flexed knee- Slowly have the patient extend the hip with the knee flexed to 90 degrees using the buttock. Repeat 15 times with each leg and perform 2 sets.

Prone alternate arm and leg extensions- Have the patient slowly extend the involved hip with the knee in extension and simultaneously raise the opposite arm off the surface, maintaining a neutral spine. Alternate movements with the other side. Repeat 15 times w each side and perform 2 sets.

Prone hip extension on exercise ball- Have the patient lie prone over a exercise ball so that the pelvis in supported and the spine is in neutral position. The hands are placed on the floor in a push up position and the legs are extended so that the patient is on the toes. The patient is instructed to slowly lift on leg at time keeping the low back relaxed and the pelvis still. Perform 15-20 reps with each leg. Perform 2-3 sets.

Prone alternate arm and leg extensions on exercise ball- Have the patient lie prone over an exercise ball so that the pelvis in supported and the spine is in neutral position. The hands are placed on the floor in a push up position and the legs are extended so that the patient is on the toes. The patient is instructed to slowly lift one arm leg and the opposite leg simultaneously keeping the mid and low back relaxed and the pelvis still. Perform 15-20 reps with each arm. Perform 2-3 sets.

Prone plank progression

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- **Modified prone plank-** Have the patient assume a position where they are on the knees and elbows. The forearms and hands are parallel. The spine and pelvis are in a neutral position. Instruct the patient to flex knees to 90 degrees maintaining a neutral spine and pelvis as they come onto the knees and elbows**.** Hold this position for 30 seconds to 60 seconds as tolerated. Perform 3 sets.
- **Half prone plank/Pillar bridge-** Instruct the patient to assume a prone plank position on the elbows and toes. Maintain a neutral spine and pelvis at all times. Hold this position for 30 seconds to 2 minutes.
- **Full prone plank-** Instruct the patient to assume a full prone plank position with the arms in a push up position. Maintain a neutral spine and pelvis during the exercise. Hold this position for 60 seconds to 3 minutes.
- **Full or Half prone plank on BOSU-** Place the feet on either the soft or hard side of a BOSU. Maintain a neutral spine and pelvis during the exercise. Hold this position for 60 seconds to 3 minutes.
- **Full or Half prone plank with lateral slides-** Place toes on a slide board and slowly abduct legs out to side maintaining a level pelvis and spine during the movement. Hold this position for 60 seconds to 3 minutes.

Quadruped Progressions:

Quadruped anterior/posterior pelvic tilts- Have the patient assume a quadruped position with the hands positioned directly under the shoulder and knees under the hips. The spine and pelvis are in a neutral position. The patient is instructed to tilt the pelvis arching and rounding the low back during the movements. Perform 30 reps and perform 2 sets.

Quadruped arm lifts – Have the patient assume a quadruped position with the hands positioned directly under the shoulder and knees under the hips. The spine and pelvis are in a neutral position. The patient is instructed to lift one arm at a time keeping the trunk and pelvis still and relaxed. Perform 15- 20 reps with each arm. Perform 2-3 sets.

Quadruped hip extensions- Have the patient assume a quadruped position with the hands positioned directly under the shoulder and knees under the hips. The spine and pelvis are in a neutral position. The patient is instructed to lift one leg at a time keeping the trunk and pelvis still and relaxed. Perform 15- 20 reps with each arm. Perform 2-3 sets.

Quadruped alternate upper and lower extremity lifts- The patient is instructed to lift one arm and the opposite leg at a time keeping the trunk and pelvis still and relaxed. Perform 15- 20 reps with each arm. Perform 2-3 sets.

- May add resistance with exercise band or perform movement with same sides to increase difficulty

½ Kneeling Progression

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½ kneeling pelvic clocks- The patient assumes a half kneeling position on the involved knee. The patient spine is in neutral and pelvis level. The patient is then instructed to slowly moving pelvis from 12-6 o'clock positions. Once control is established and range of motion is gained begin to move in opposite direction between numbers 1-7, 2, 8, 3-9, 4-10, 5-11. Repeat 20 times each direction in ranges that are tight. Perform 2-3 sets. Repeat on uninvolved.

½ kneeling weight shifts- The patient assumes a half kneeling position on the involved knee. The patient's spine is in neutral and the pelvis level. The patient is instructed to shift the body forward onto the front leg while maintaining a neutral spine and not letting the back arch or round. A gentle stretch should be felt in the front of the hip. Hold position for 15 seconds and repeat 10-15 times on each leg.

½ kneeling upper shoulder girdle strengthening- The patient assumes a half kneeling position on the involved knee. The patient is instructed to perform upper extremity strengthening exercises focusing on the shoulder girdle and trunk using Resistance bands, dumbbells, medicine balls, etc. upper extremity strengthening exercises are performed. The patient is instructed to always maintain a neutral spine and pelvis during the exercise**.**

½ kneeling trunk rotations- The patient assumes a half kneeling position on the involved knee. The arms are extended out in front with the hands together. The patient rotates the trunk and upper extremities side to side while maintaining a neutral spine and pelvis. The pelvis remains forward and in neutral during the exercise and the trunk is rotated from the top down. Repeat 10-15 times to each side and perform 2-3 sets.

Gait Progression

Standing side to side weight shifts- Have the patient stand at the edge of table to chair and shift weight side to side, maintaining a level pelvis. Perform 2-3 sets for 30-90 seconds.

Standing anterior and posterior weight shifts- Have the patient in stagger stance position with the involved leg forward. The patient is instructed to shift the body weight to the front leg until the back toes lift off the floor. The pelvis and spine are maintained in a neutral position. Perform 2-3 sets for 30-90 seconds. Repeat with the uninvolved leg forward. Fascilitation to the pelvis in diagonal directions is also beneficial for gait re-training.

Backward walking- Have the patient walk backward focusing on extension of involved hip and maintaining neutral spine and pelvis.

Side stepping- Have the patient side step with the knees slightly flexed and the spine and pelvis in neutral. Maintain a level pelvis and shoulders during the movement.

Side stepping with resistance band- Place a resistance band around the ankles. Have the patient assume a one third knee bend position, bending the knees to approximately 30 degrees of flexion and keeping the pelvis level. Have the patient slowly side step keeping the shoulder and pelvis level and avoiding any trunk motion. Do not let the feet come together, always maintain the feet shoulder width apart during the movements. The patient should perform the side stepping to both

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sides. Have the patient step 30 feet one direction and 30 feet the opposite direction. Repeat 2-3 laps.

Retro walking with resistance band- Place a resistance band around the ankles. Have the patient assume a one third knee bend position, bending the knees to approximately 30 degrees of flexion and keeping the pelvis level. Have the patient slowly step in a diagonal and backward direction. Bring the opposite foot to the step foot. Repeat to the other side. Have the patient step 30 feet one direction and 30 feet the opposite direction. Repeat 2-3 laps.

Closed Chain Squat Progression

Exercise ball wall sits- Have the patient stand with an exercise ball placed in the low back against a wall. Have the patient stand so that the feet are shoulder width apart and so that the knees do not go past the toes during a squat. Instruct the patient to slowly squat as if sitting in a chair. Have the patient maintain a neutral spine and slowly return to starting position. Have the patient perform 3 sets of 15-20 repetitions.

One third knee bends – Have the patient stand with the feet shoulder width apart and the feet slightly toed in. Instruct the patients to squat down as if they were going to sit in a chair only flexing the knees to 30 degrees. The spine is in neutral and pelvis level throughout the exercise. Repeat 20 times and perform 3 sets.

Repeal all above instructions with Progression will include same instructions…

Double leg squats – Instruct the patient to slowly work on squat depth working towards to 70 degrees of flexion and the knees and hips maintaining a neutral spine.
Double leg squat with weight shifts- Instruct the patient to slowly shift weight side to side while maintaining a double leg squat. Perform 3 sets of 15-20 repetitions each side.

Balance squats- Have the patient place the uninvolved foot on a chair behind them using the foot only for balance. Have the patient begin with a one third knee bend on the involved and progressing to a squat position as tolerated. Instruct the patient to avoid pushing through the support leg. Perform 3 sets of 15-20 reps.

Single leg one third knee bends- Have the patient assume single leg stance on the involved leg while maintaining a level pelvis. Instruct the patient to slowly squat down to 30 degrees of knee flexion as if they were sitting in a chair. Avoid femoral valgus/IR on the squat leg and dropping the pelvis on the contralateral side. Perform 3 sets of 15-20 reps

Single leg squats- Have the patient squat to 70 degrees of knee and hip flexion**.** Perform 3 sets of 15-20 reps

Balance squats with rotations- Have the patient slowly rotate trunk side to side with arms held together out in front of patient. May hold a medicine ball to increase difficulty. Perform 3 sets of 15-20 reps

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Slide board exercises

Lateral slides - Have the patient assume a one third knee bend position. Slowly slide the involved foot outward extending the knee. The standing knee is maintained in a neutral position at 30 degrees of flexion. The pelvis stays level and spine in neutral. Repeat 20-30 times and perform 2-3 sets. You can also have patient perform this moving the leg at a diagonal into extension as if skating.

Lateral lunge slides- Have the patient assume stand with knees extended and shoulder width apart with involved leg on slide board. Instruct the patient to slowly slide the involved foot outward squatting onto the uninvolved leg as if lunging. The standing knee is maintained in a neutral position during the movement. The pelvis stays level and spine in neutral. Repeat 20-30 times and perform 2-3 sets. You can also have patient perform this moving the leg at a diagonal into extension as if skating.

Hip split slides- Have the patient stand with both feet on the slide board with the outside foot resting against the edge of the board. Instruct the patient to slowly push off the outside foot sliding their body towards the opposite side but keeping their outside foot against the board. The pelvis should remain level at all times and the knees should be straight during the entire movement. Slowly bring the outside leg back to the starting position by pulling the leg in and returning to a standing position. Repeat this slide in both directions. Perform 15 repetitions and do 2-3 sets.

Reverse lunge slides- The patient assumes a staggered stance position, standing with the involved leg off the end of the slide board and the uninvolved foot on the board. The patient is instructed to slowly slide the uninvolved (back leg) backward bending the involved knee into a lunge position. Do not bring the knee past the toes and maintain a level pelvis and upright neutral spine during the movement. Slowly return to the starting position bring your involved knee to an extended position. Perform 15 repetitions and do 2-3 sets.

Lunge Progressions

Split lunge- Have the patient assume a staggered split stance position with the involved leg forward. Have the patient slowly lower the body toward the floor bending both knees so that the end position is lunge. Maintain a level pelvis and lumbar spine during the movement. Perform 3 sets of 15-20 reps

Forward lunge- Instruct the patient to slowly lunge forward onto involved leg. Maintain a neutral pelvis and trunk posture during the motion. Have the patient slowly absorb onto involved leg avoiding any compensation at the knee. Perform 3 sets of 15-20 reps. Repeat with the other leg.

Lateral lunge- Instruct the patient to slowly lunge to the involved side. Perform 3 sets of 15-20 reps

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Reverse lunge- Instruct the patient to slowly perform a reverse lunge by stepping backward with the uninvolved leg. Perform 3 sets of 15-20 reps

Lunge with trunk rotations- Have the patient slowly rotate the trunk side to side with the arms out in front of them from any of the lunge positions. Perform 3 sets of 15-20 reps

Balance progression

Single leg balance- Have the patient shift weight to involved leg while maintaining a level pelvis and neutral spine. Have the patient hold the position for 30-60 seconds and repeat 3 times.

- May have the patient stand on altered surface to increase difficulty (Foam/BOSU/dynadisc)

Standing single leg hip hiking with ball- Have the patient stand on the involved leg with the opposite pelvis against an exercise ball that is resting on the wall (at hip height?). Have the patient bend the uninvolved knee (ball side). Instruct the patient to slowly hike the pelvis upward on the uninvolved side by squeezing the buttock. Instruct the patient to not use their back to hike their pelvis but focus on contracting the muscles of the buttock. Repeat 20 times and perform 2-3 sets.

Standing single leg balance with opposite hip abduction isometric- Have the patient stand on the involved leg with the opposite knee against an exercise ball that is resting on the wall. Have the patient, slightly bend both knees to 20 degrees of flexion. Then instruct the patient to bend the uninvolved knee to 90 degrees and press the outside of the knee into the ball keeping the pelvis level. If the patients uninvolved side pelvis begins to drop, instruct the patient to slowly hike the pelvis upward on the uninvolved side by squeezing the buttock. Instruct the patient to not use their back to hike their pelvis but focus on contracting the muscles of the buttock. Maintain a static hold on this position for 5-10 seconds and repeat 10-15 times.

Standing single leg balance with opposite hip isometric IR- Have the patient lean into the wall with both arms out in front as in a wall push up position. The patients body should be slightly angled toward the ball. Have the patient raise up onto the balls of both feet. Instruct the patient to flex the uninvolved hip and to 90 degrees of flexion. Manually resist internal rotation of the patients uninvolved leg while they maintain a level pelvis. Keep the spine in neutral position throughout the movement. Fatigue should be felt in the involved gluteus medius. Perform 10-15 resisted IR's and do 2-3 sets.

Standing gluteus medius isometric with FR in running position- Have the patient stand on the both legs with the uninvolved knee against a foam roller that is resting on the wall just above the knee. Have the patient shift their weight onto the balls of both feet. Instruct the patient to slightly bend both knees to 20 degrees of flexion as if they are bringing the knees over the toes (or stretching out ski boots). Have the patient slightly lean the trunk forward maintaining neutral spine and keeping the pelvis level. Then instruct the patient to bend the uninvolved knee to 90 degrees and press the outside of the knee into the ball keeping the pelvis level. If the patients

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uninvolved side pelvis begins to drop, instruct the patient to slowly hike the pelvis upward on the uninvolved side by squeezing the buttock. Instruct the patient to not use their back to hike their pelvis but focus on contracting the muscles of the buttock. Maintain a static hold on this position for 5-10 seconds and repeat 10-15 times.

Cardiovascular Program (wk 1-12)

Stationary Bike (no resistance) x 20 minutes, 1-2/day x 4 wks

- Increase duration on bike by 5 minutes/wk beginning at wk 2.

Aquatic PT Program

- Begin aquatic PT program week 3 (incisions must be well healed)

Elliptical trainer – Begin wk 6 p.o.- Start with 10 minutes increase 5 minutes/ wk for next 6 wks)

Combination program- begin alternating stationary bike and elliptical at wk. 8 for 20 minutes total time progressing as tolerated.

Treadmill walking program may begin week 12