HIP ARTHROSCOPY/ FEMOROACETABULAR IMPINGEMENT OSTEOPLASTY/LABRAL REPAIR CLINICAL PRACTICE GUIDELINE

General Guidelines

- **Progression:** Time and criterion-based, dependent on soft tissue healing, patient demographics, and clinician evaluation.
- **Contact:** Dr. Sujan Gogu's clinic

Types of FAI

1. **Pincer Impingement**

   Excessive prominence of the anterolateral rim of the acetabulum

2. **Cam Impingement**

   Overgrowth of the femoral head, causing it to rotate improperly

3. **Combined Impingement**

   A combination of pincer and cam impingements.

Pathology and Progression

Cause

Abnormal contact between the femur and acetabulum

Effects

- Limits range of motion.
- Produces shear forces leading to hip dysfunction.
- Causes chondral abrasion and labral injuries.
- Can lead to full-thickness cartilage loss and joint arthrosis.

Natural History of FAI

1. Initial acetabular cartilage injury.
2. Followed by labral injury.
3. Ultimately leads to joint arthrosis.

Hip Arthroscopy for FAI

Minimally Invasive Procedure	Used to correct bony lesions causing impingement.
Osteoplasty	• Reshapes impingement lesions on the femoral and/or acetabular side. • Removes the non-spherical portion of the femoral head. • Resections the anterior acetabular over-coverage.
Labral Repairs	• Aims to maintain joint mechanics and distribute forces evenly around the joint. • **Procedure:** ➢ Anchors are placed on the acetabular rim. ➢ Sutures are passed through and around the labrum. ➢ Labral tissue is re-approximated and secured.

Recommendations

Precautions

- **Weight Bearing (WB) Restrictions:**
    - *For 2 weeks:* Foot flat WB with crutches for.
    - *Within 2-4 week:* Walk without crutches(preferably transitioning from 2 crutches to none).
- **Pain Avoidance:**
    - Avoid any "pinch" feeling in the hip.
    - Prevent hip flexor/adduction aggravation as strengthening and activity progress.

ROM/Manual Therapy

- **Early Motion:**
    - Prevent adhesions by promoting early motion.
    - Use circumduction (after PT instruction) or no-resistance upright biking for passive range of motion (PROM).
- **Range Limitations:**
    - Limit external rotation and extension ROM during the early post-op phase.
    - No aggressive PROM or stretching until at least 8 weeks (only if excessive hypomobility is present).

Corrective Interventions

- **Muscle Activation:**
    - Ensure proper activation and recruitment of all hip and core musculature without compensation before starting strengthening exercises.
- **Neuromuscular Re-education:**
    - Focus on balance and correction of faulty mechanics.

- Therapeutic exercise and neuromuscular re-education for lower extremity (LE) strength, emphasizing double-leg (DL) and single-leg (SL) activities.

Outcome Testing

- **Timing:**
  - *After 6 weeks:* Conduct tests at the 1st visit, and discharge (increase frequency if necessary).
- **Tools:**
  - Use the Hip Outcome Score (HOS) with ADL (17 items) and Sports (9 items) subscales.

Criteria to Initiate Plyometric Program

- Full, functional, pain-free ROM.
- *80%* strength in quadriceps, hamstrings, and hips compared to the uninvolved leg (using a hand-held dynamometer).
- Ability to squat > *150%* body weight (BW) using a barbell squat or leg press.
- "*10 forward and lateral step-downs from an 8"* step with proper mechanics.

Criteria to Initiate Running Program

- Full, functional, pain-free ROM.
- *80%* strength in quadriceps, hamstrings, and hips compared to the uninvolved leg (using a hand-held dynamometer).
- Ability to squat > *150% BW* using a barbell squat or leg press.
- *"10 forward and lateral step-downs from an 8"* step with proper mechanics.
- Ability to hop and hold with proper mechanics (from uninvolved to involved leg).
- Tolerate *200-250* plyometric foot contacts without reactive pain/effusion.
- No gross visual asymmetry and a rhythmic strike pattern with treadmill or overground running.

Criteria for Return to Sport/Discharge	
Clearance	• Obtain physician clearance at the last check-up
Strength	• 90% compared to the uninvolved hip (using a hand-held dynamometer) • 90% BW with single-leg (SL) leg press.
Functional Performance	• 90% limb symmetry with SL hop for distance, SL triple crossover hop, and SL 6-meter timed hop (with proper lower extremity landing mechanics). • Ability to complete sport-specific drills at maximum speed without pain. • Use the Vail Sport Test.
Outcome Measures	• Score ≥ 90% on HOS (ADL and Sports subscales)

For patients not returning to sport, ensure they can perform all ADLs and recreational activities without pain, reactive effusion, and with proper functional mechanics before discharging from PT.

Phase I: Day 1 Post-Op until Discharge from Crutches (0-4 weeks)	
Category	**Details**
Goals	• Protect healing tissue • Control pain and edema (use compression garments/shorts) • Improve pain-free ROM • Normalize muscle activation

Category	Details
Precautions	• No sitting > 2 hours • Avoid hip extension (slow walking speed, no treadmill use) • Gentle external rotation (ER) as tolerated • Avoid twisting/pivoting • No active straight leg raises (SLRs) or crunches/sit-ups • No lifting/carrying > 10 lbs - Avoid pain
Crutch Progression	• 2 crutches to 0 crutches recommended to normalize gait mechanics • 2 to 1 to 0 crutches if needed to slow progression or limit walking distance
Criteria for Community Ambulation without Crutches	• Adequate hip ROM for a normalized, pain-free gait pattern (10° hip extension) • Score of 0-1 on 10 reps of Active Hip Abduction Test *(Appendix B)* • 60 seconds of single leg stance (SLS) without compensation or pain • Normalized gait pattern without assistive device
ROM/Stretching	• Circumduction (begin only after PT education; review mechanics with family at 1st PT visit) • *30° and 70°* of hip flexion for *6* minutes each (3 minutes clockwise, 3 minutes counterclockwise) • Can be replaced with *10-15* minutes of upright biking with no resistance (x2 daily) • **PROM (pain-free):** Hip flexion, abduction, prone hip internal rotation (IR) and ER • **Stretches**: prone quadriceps, supine iliopsoas (uninvolved knee to chest) • Prone lying to prone prop on elbows for 5-10 minutes (x2 daily)

Category	Details
	• Gentle scar mobilizations can begin after incisions are closed
Neuromuscular Control	• No not progress to strengthening until muscle activation and isolated control is normalized • Focus on gluteal muscles (prone, supine, seated, ½ kneel, tall kneel, standing), transverse abdominis, hamstrings, quadriceps • Supine hip abduction/adduction, prone hip IR/ER, prone terminal knee extension (TKE)
Therapeutic Exercise	**Early Exercises** • Supine butterflies and reverse butterflies • Quadruped cat/camel • Quadruped backward rocking, prone hamstring curls, bridges **Advanced Exercises** • *Criteria to begin:* normalized gait pattern, minimal reactive pain and edema • Sidelying clams, supine marches (without bridge) • Heel slide to march • Standing TKE with focus on pelvic stability and appropriate weight shifting • Passive FABER slides
Criteria to Progress to Phase II	• Normalized gait pattern for household distances • Minimal to no reactive pain and swelling with ADLs and PT exercises • Muscle activation and isolation normalized • Pass the Prone Hip Extension Test *(Appendix A)* • 10 repetitions with proper gluteal muscle activation (gluteus maximus first, hamstrings second) • Leg extends 10° past neutral

Category	Details
	• No compensatory movement patterns at pelvis (no anterior pelvic tilt) • No anterior hip pain

Phase II: Discharge Crutches to Pain-free with ADLs (4-8 weeks)	
Category	**Details**
Goals	• Restore full PROM and AROM • Progressively improve strength of proximal hip musculature (gluteals, iliopsoas, hip rotators) • Normalize postural/pelvic control with DL and SL activities • Normalize gait at preferred walking speed for community distances • Tolerate ADLs without pain or limitation
Precautions	• Avoid joint and/or soft tissue aggravation from early/excessive activity progression • Avoid aggressive stretching into hip extension/ER (including modified Thomas test position) • Avoid running or impact activities
ROM/Stretching	• Soft tissue and joint mobilization for symmetrical PROM • Avoid aggressive end-range stretching • Upright bike, butterfly/reverse butterfly stretches, FABER slides, half-kneeling hip flexor stretch, prone IR/ER PROM • Consider massage therapy if soft tissue dysfunction/irritation occurs • Soft tissue irritation indicates a need to regress activities/exercises • Continually assess patient's current activity level outside

Category	Details
	of PT
Therapeutic Exercise	**Early Exercises:** Bridge progression, quadruped progression, DL squat, leg press, side planks, modified forward plank progression, resisted side-stepping (start with band at knees) **Late Exercises:** Ensure patient meets community ambulation criteria and demonstrates mastery of DL tasks before starting full WB SL exercises Forward and lateral step-ups, heel taps, ER progression (on stool, standing on ipsilateral LE), SL Romanian deadlift (RDL), SLS with perturbations Aquatic therapy can be initiated once the incision is healed and the patient is cleared by a physician
Cardiovascular Exercise	• May progress time on upright bike as tolerated • Ensure patient can perform 30 minutes with no resistance and without symptoms before adding resistance • Reduce time to ≤15 minutes when adding resistance • May begin elliptical use when the patient demonstrates adequate hip extension, gluteal activation, and lumbopelvic stability
Criteria to Progress to Phase III	• Symmetrical and pain-free hip ROM to meet the demands of patient's activities • Symmetrical DL squat to 70° of knee flexion • 10 repetitions of 8" step downs with good neuromuscular control • Normalized gait pattern for community distances of ambulation

Phase III: Pain-free ADLs to Return to Impact Activities (8-12 Weeks)

Category	Details
Goals	• Correct abnormal/compensatory movement patterns with higher level strengthening activities • Avoid any "pinch" feeling in the hip • Optimize neuromuscular control, balance, and proprioception • Increase volume and intensity of aerobic activities; restore non-impact cardiovascular fitness • Initiate progressive plyometric activities • Return to run program can be initiated towards the end of phase III if criteria are met
Precautions	• Avoid sacrificing quality for quantity during strengthening • Avoid hip flexor/adductor inflammation as activity increases • Ensure patient maintains full flexibility and pain-free ROM as strength increases • Avoid aggressive stretching unless significant hypomobility is noted
ROM/Stretching	• Periodically check ROM to ensure new exercises do not alter neuromuscular response and joint mechanics • Initiate terminal stretches if full ROM is not achieved by week 10
Therapeutic Exercise	• **Continue progressive LE/core strengthening**: slow to fast, simple to complex, stable to unstable, low to high force • Advance DL strengthening to SL strengthening • Progress core stability tasks with emphasis on rotational and side-support tasks (e.g., side planks, cable crossovers, kneeling chops/lifts, windmill, plank to pike, plank over SB) • Perform LE strengthening tasks with multi-planar movements, emphasizing core stability and hip/knee control (avoid valgus) • Enhance proprioception by varying surfaces, adding

Category	Details
	perturbations, and including a variety of positions
Cardiovascular Exercise	• Initiate dynamic warm-up (e.g., inchworm, progressive lunges towards end of phase) • Progress resistance and cross ramp on elliptical as tolerated (refer to return to biking protocol) • Begin swimming progression and freestyle kick; avoid rotational kicks (refer to return to swimming protocol)
Plyometrics	**Criteria to Initiate Plyometric Program** • Full, functional, pain-free ROM • >80% quadriceps, hamstring, and hip strength compared to uninvolved leg (using hand-held dynamometer) • Squat 150% BW (barbell squat or leg press) • Perform 10 forward and lateral step downs from 8" step with proper alignment (Appendix D) **Progression** • Progressive weight-bearing, DL to SL demands • Shuttle plyometrics (DL to SL) • Forward hop and hold (uninvolved to involved) • DL mini hops/place jumps **Emphasize proper take-off and landing mechanics:** • NO knee valgus, good pelvic stability, soft/quiet landing with equal force distribution • Initiate agility ladder if appropriate form and tolerance to activity in progressive plyometrics are demonstrated

Return to Running

Criteria for Initiating Walk/Jog Progression

- Full, functional, pain-free ROM

- 80% quadriceps, hamstring, and hip strength compared to the uninvolved leg (using hand-held dynamometer)
- Squat 150% BW (barbell squat or leg press)
- 10 forward and lateral step downs from an 8” step with proper alignment
- Hop and hold with proper mechanics (uninvolved to involved x10 repetitions)
- Ability to tolerate 200-250 plyometric foot contacts without reactive pain/effusion
- No gross visual asymmetry and rhythmic strike pattern with treadmill or overground running

Walk/Run Progression		
Walk/Run Progression Phase	**Walk/Run Ratio**	**Total Time**
1	4 min / 1 min	10-20 min
2	3 min / 2 min	10-20 min
3	2 min / 3 min	10-20 min
4	1 min / 4 min	10-20 min
5	Jog every other day until able to run 30 consecutive minutes. Begin with a 5-minute walking warm-up and end with a 5-minute walking cool-down.	
General Guidelines		

Progression

Complete each phase according to the Total Time guidelines: 10 minutes x2 sessions, 15 minutes x1 session, 20 minutes x1 session. After completing any phase pain-free for 20 minutes, the patient can progress to the next phase.

Rest

Allow at least one day of rest between runs.

Distance Before Pace

Gradual increase in distance is a priority before increasing pace.

Pain Management

It is common for runners to experience increased pain and/or reactive edema at least once during the return to run progression. If pain occurs, stop running immediately and rest for at least one day before restarting the program. Upon restarting, perform the last pain-free walk/jog ratio cycle x2 before attempting the previously painful ratio cycle.

Ten Percent Rule

Only increase weekly mileage by 10% of the previous week.

Phase IV – Return to Sport / Full Activity (3-6+ Months)	
Category	**Details**
Goals	• Initiate return to run program if not initiated in phase III • Return to physically demanding jobs • Progressively return to sport or prior/desired level of function
Precautions	• Emphasize proper landing mechanics (DL and SL) • Avoid plyometric progression if pain increases (re-assess and address strength/neuro impairments) • Maintain full flexibility and pain-free ROM • Monitor return to sport progression
ROM/Stretching	• Continue previous ROM interventions and stretches • Include multi-planar lumbar and hip ROM/flexibility • Emphasize dynamic warm-up and stretching

Category	Details
	(walking lunges, hurdle steps, etc.) • Monitor sport-specific stretching and end range stretches
Therapeutic Exercise	• Focus on hip and core strengthening with emphasis on pelvic stability • Maintain DL strength but emphasize SL strengthening (both involved and uninvolved)
Neuromuscular Control and Functional Performance	• Progress agility and plyometrics with higher-level activities (forward/backward hopping, side shuffles, carioca, cutting, box drills, T drills, tuck jumps, DL/SL jump turns) • Focus on hip and pelvic stability • Incorporate unstable surfaces with plyometrics • Sport-specific drills in clinic (moderate speed to maximum speed) • Complete return to run program without reactive pain/inflammation before speed training • Ensure tolerance with DL and SL plyometrics before initiating power-focused or explosive training
Criteria to Return to Sport/Discharge	• Physician clearance at last check-up **Strength**: • > 90% compared to uninvolved hip (hand-held dynamometer) • > 90% with SL leg press at body weight (repetitions to fatigue) **Functional Performance:** • 90% limb symmetry with SL hop for distanceSL triple crossover hop, and SL 6-meter timed hop (with proper LE landing mechanics) • Complete sport-specific drills with correct mechanics at maximum speed without pain

Category	Details
	• Vail Sport Test *(Appendix E)* **Patient reported outcome measures:** • Score ≥ *90%* on HOS (ADL and Sports subscales)

Appendices

Appendix A: Prone Hip Extension Test

Purpose: Assesses the ability to activate the gluteus maximus while maintaining lumbo-pelvic-hip control.

Criteria to Pass the Test:

Criteria	Details
Repetitions	Perform 10 repetitions
Muscle Activation	Proper gluteal muscle activation: gluteus maximus first, hamstrings second
Leg Extension	Leg extends 10° past neutral
Pelvic Movement	No compensatory movement patterns at the pelvis (no anterior pelvic tilt)
Pain	No anterior hip pain

Appendix B: Active Hip Abduction Test

Purpose: Evaluates control of the pelvis in the frontal plane during hip abduction.

Scoring System and Cues for Examiner:

Score	Description	Details
0	Able to maintain position of pelvis in the frontal plane	Smoothly and easily performs movemen lower extremities Pelvis

Score	Description	Details
		Trunk Shoulders remain aligned.
1	Minimal loss of pelvis position in the frontal plane	Slight wobble at initiation or throughout any movement Noticeable effort or "ratcheting" of moving limb.
2	Moderate loss of pelvis position in the frontal plane	At least 2 of the following: **1.** Noticeable wobble **2.** Tipping of pelvis **3.** Trunk or shoulder rotation **4.** Hip flexion/rotation **5.** Uncontrolled movement.
3	Severe loss of pelvis position in the frontal plane	More than 3 of the above characteristics and/or unable to regain control once lost May lose balance (hand on table).

Appendix C: Psoas Progression

Purpose: Strengthening the iliopsoas muscle while maintaining abdominal drawing-in maneuver and neutral lumbar spine alignment. Clinicians can choose from two different progressions based on preference.

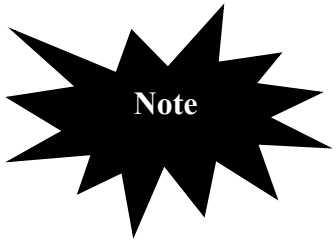
Psoas Progression A:

Exercise	Description
A) Supine Short-Lever Hip Flexion	Performed lying on the back, lifting the knee towards the chest while keeping the knee bent.

Exercise	Description
B) Seated Hip Flexion	Performed sitting on a chair, lifting the knee towards the chest while keeping the knee bent.
C) Seated Hip Flexion on Swiss Ball	Performed sitting on a Swiss ball, lifting the knee towards the chest while keeping the knee bent.
D) Standing Hip Flexion with Theraband Resistance	Performed standing, lifting the knee towards the chest against theraband resistance.

Psoas Progression B:

Exercise	Description
A) Marching	Performed lying on the back, alternating lifting knees towards the chest in a marching motion.
B) Walk Out	Performed lying on the back, lifting the knee towards the chest and then extending the leg out straight, alternating legs.
C) Heel Slide	Performed lying on the back, sliding one heel along the floor towards the buttock and then back out.
D) Heel Slide with SLR (Straight Leg Raise)	Performed lying on the back, sliding one heel along the floor towards the buttock, then extending the leg straight and lifting it up.



All exercises should be performed with simultaneous abdominal drawing-in maneuver.
Maintain lumbar spine in neutral alignment throughout each exercise.

Appendix D: Forward Step Down Test

Definition of Errors and Their Interpretation

Error Type	Description	Interpretation
Arm Strategy	Subject uses arms to regain balance	**1 point**
Trunk Movement	Trunk leans to the right or left	**1 point**
Pelvic Plane	Pelvis rotates or elevates on one side	**1 point**
Knee Position	**Knee deviates medially:** Tibial tuberosity crosses an imaginary vertical line over the 2nd toe	**1 point**
- Tibial tuberosity crosses an imaginary vertical line over the medial border of the foot	2 points	
Balance	Subject steps down on the uninvolved side or tested leg becomes unsteady	**1 point**

Quality of Mechanics Based on Errors

Number of Errors	Quality of Mechanics
0-1 errors	Good quality
2-3 errors	Medium quality
4+ errors	Poor quality

Appendix E: Vail Sports Test

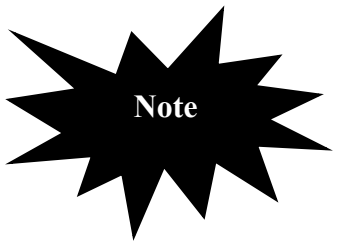
Total Points: _____/54 (Patient must score 46/54 to pass)

Single Leg Squat (Goal: 3 minutes)

Procedure: Perform each repetition at a cadence of 1 second up and 1 second down against the resistance of a sportcord placed under the testing leg's foot.

Criteria	Yes (1)	No (0)	Minute 1	Minute 2	Minute 3
Knee flexion angle between 30° and 60°					
Repetitions without dynamic knee valgus					
Avoids locking knee during extension					
Patella does not extend past the toe during knee flexion					
Maintains upright trunk during knee flexion					

Single Leg Squat Total Points: _____/15



If the patient repeats an error on 3 consecutive repetitions after correction, they are not eligible to receive a point for that particular standard (within each 1-minute timeframe).

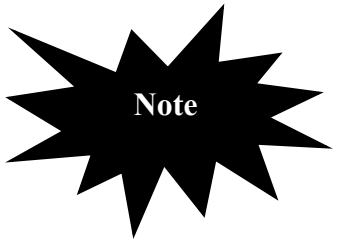
Lateral Bounding (Goal: 90 seconds)

Procedure: Perform lateral hopping motion against the resistance of a sportcord attached to the waist and an immovable object. Hop from one leg to the other, absorbing energy by bending at the knee and hip.

Criteria	Yes (1)	No (0)	1st 30 seconds	2nd 30 seconds	3rd 30 seconds
Knee flexion angle is 30° or greater during landing					
Repetitions without dynamic knee valgus					

Criteria	Yes (1)	No (0)	1st 30 seconds	2nd 30 seconds	3rd 30 seconds
Repetitions within landing boundaries					
Landing phase does not exceed 1 second in duration					
Maintains upright trunk during knee flexion					

Lateral Bounding Total Points: _____/15



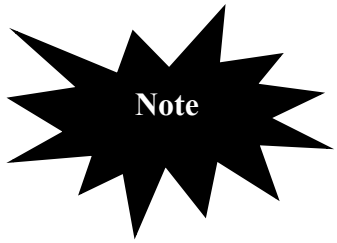
If the patient repeats an error on 3 consecutive repetitions after correction, they are not eligible to receive a point for that particular standard (within each 30-second timeframe).

Forward Jogging (Goal: 2 minutes)

Procedure: Perform forward jogging against the resistance of the sportcord with the belt around the waist, hopping from one leg to the other while maintaining proper form.

Criteria	Yes (1)	No (0)	Minute 1	Minute 2
Knee flexion between 30° and 60°				
Repetitions without dynamic knee valgus				
Repetitions within landing boundaries				
Avoids locking knee during extension				
Landing phase does not exceed 1 second in duration				
Maintains upright trunk during knee flexion				

Forward Jogging Total Points: _____/12



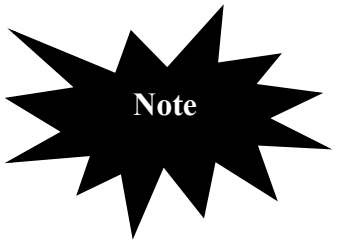
If the patient repeats an error on 3 consecutive repetitions after correction, they are not eligible to receive a point for that particular standard (within each 1-minute timeframe).

Backward Jogging (Goal: 2 minutes)

Procedure: Perform backward jogging against the resistance of the sportcord with the belt around the waist, hopping from one leg to the other while maintaining proper form.

Criteria	Yes (1)	No (0)	Minute 1	Minute 2
Knee flexion between 30° and 60°				
Repetitions without dynamic knee valgus				
Repetitions within landing boundaries				
Avoids locking knee during extension				
Landing phase does not exceed 1 second in duration				
Maintains upright trunk during knee flexion				

Backward Jogging Total Points: _____/12



If the patient repeats an error on 3 consecutive repetitions after correction, they are not eligible to receive a point for that particular standard (within each 1-minute timeframe).