Rehabilitation Protocol after Periacetabular Osteotomy (PAO Surgery)

- The following is an outline of the post-operative rehabilitation program for periacetabular osteotomy procedures utilized by Dr. Michael K. Ryan, MD.
  - This protocol is to be utilized as a guideline to assist communication between the surgeon, rehabilitation team, and patient during the recovery process.
  - Individual patient differences regarding progression and/or tolerance of specific activities can vary. Obtain the post-operative report prior to treatment.
  - The rehabilitation program should create the optimal environment for the natural process of healing to occur.
  - The therapist must constantly be aware of changes in condition in order to communicate effectively back to the surgeon and patient.
  - The patient’s home exercise program is of utmost importance and should be monitored and emphasized.
  - Progression through the protocol will depend on any concomitant pathology identified, successful accomplishments of set milestones determined in part by the physician and the physical therapist’s confidence level.
- Remember, discharge and/or return to play should be ability based not time based.

Weight bearing and precautions:
- 0-4 weeks: 20% Foot Flat Partial Weight Bearing (~ 30-45lbs) with bilateral crutches/walker
- 5-6 weeks: Initiate progression of weight bearing gradually with goal to be WBAT with 2 crutches at 6-7 weeks
- 8-10 weeks Progress Weight bearing to as tolerated depending on healing/MD agreement

Modalities:
- Continuous Passive Motion (CPM): 0-45° progressing to 0-90° if tolerated
- Russian/NMES to quadriceps/glutes during voluntary quadriceps isometrics
  - If a home unit is available the patient can perform 4-6 hours per day
- Class IV LASER for scar management and soft tissue management
- Cryotherapy for pain
  - GameReady or ice for 30 minutes on 30 minutes off continuously for first 2 weeks
- Moist hot packs
  - Apply heat 10-20 minutes prior to PROM/pain relief
- Blood Flow Restriction Training
  - If not contraindicated, check with surgeon prior to initiation

Patient Education:
- Review the vital role the post-operative rehabilitation program has in good outcomes
- Review restrictions associated with the procedure
- Review estimated timeline of protocol progression based on desired level of activity
Immediate Post-Operative Phase I:

- Inpatient Hospital: (0-72 hrs)
  - Teach bed mobility
  - Dangle at edge of bed
  - Educate on post-operative precautions
  - Encourage ankle pumps, quad/adductor/gluteal sets
  - PT to perform passive range of motion
    - Gentle log rolling (neutral to internal only, no ER)
    - Flexion 0-45˚ (max 90˚ if tolerated)
    - Internal rotation 10˚, limit ER to neutral (0˚)
    - No extension ROM
  - Plan on Discharge day 2/3, begin outpatient therapy next day

Early Rehabilitation Phase II:

Goals:

- Control swelling and pain
- Protect surgical fixation and repair
- Gradually restore voluntary muscle contraction
- Initiate ambulation with crutches/walker with restrictions
- Continue restoration of passive range of motion
- Patient understanding of restrictions and rehabilitation expectations

Physical Therapy Outpatient Day 1-20:

Weightbearing:

- Maintain 20% Foot Flat PWB (30-45lbs) with bilateral crutches/walker
- Cue to lift heel quickly during mid-stance to limit hip extension
- Avoid twisting and rotation in loaded position

Range of Motion:

- No active range of motion
- Hip flexion 0-90˚ as tolerated (don’t push through resistance)
- Passive hip circles at 45-60˚ of hip flexion by PT
- Gentle log roll to tolerance with bolster under knee, limit 20˚ ER
- Hip External/Internal Rotation 20˚ with knee flexed 45-60˚ (limit ER in extension)
- Hip Abduction: Gentle ROM as tolerated
- No hip extension beyond neutral

Exercises:

- Quad sets
- Gluteal sets
- Adductor sets
- Ankle Pumps
- Prone active knee flexion to 90˚ (affected extremity)
• Prone quad stretch with towel roll under hip (starting ~2 weeks)

Modalities:
• As indicated throughout the course of recovery

Physical Therapy Weeks 3-4:
• Instruct patient on scar management and mobilization after sutures removed

Range of Motion:
• No AROM
• Gentle hip joint mobilization as indicated
• Continue PROM as indicated above
• Initiate progression of extension “belly time”

Exercises:
• Continue exercises listed above
• Initiate:
  o Prone lying
  o Active Assisted heel slides, limit TFL/Sartorious activation
  o Upright exercise bike with no resistance
  o Hamstring mobilization
  o Bent knee fall out with assistance back to neutral starting point
• Week 4: Aquatic therapy depending on incision status, check with MD
  o Isometric hip flexor activation (with hip flexed over bolster 45-60˚)
    ▪ Submaximal, pain-free

Physical Therapy Weeks 5-6:
Weight bearing:
• Progress gradually to WBAT w/crutches starting at week 5 if no pain
• Teach swing through gait

Range of motion:
• Continue range of motion as listed weeks 3-4
• Gradually progress hip extension as tolerated
• No active range of motion until week 6
• Initiate AAROM to AROM progression gravity eliminated to against gravity

Exercises:
• Continue exercises as listed weeks 3-4
• Add supine marching (week 5)
• Week 6: Consider initiation of Alter G treadmill, if appropriate
  o Standing hip flexion, limited range
Intermediate Rehabilitation Phase III:

Goals:
- Continue pain management
- Progress weight bearing to full weight bearing, normalize gait
- Full restoration of passive range of motion in all planes
- Restoration of hip stability and strength
- Initiate weight bearing motor control/propropioception exercises
- Prepare for return to jogging/running

Physical Therapy Weeks 7-9:

Weight bearing:
- Normalization of ambulation with assistive device
- Week 7-9: progress to WBAT if cleared by MD depending on radiographic healing
  - No limp present to progress to no assist devices, otherwise use 1 crutch or cane

Range of motion:
- Continue hip joint mobilization as indicated (minimal if hypermobility present – capsule imbricated/shifted)
- PROM at end range with overpressure
- Continue AAROM/AROM progression to as tolerated

Exercise:
- Continue progression of exercises weeks 1-6
- Initiate gentle resisted AROM as tolerated
- Initiate dynamic weight shifting exercises
- Initiate closed chain strengthening in accordance with weight bearing status
- Bilateral bridging
- Progress core stabilization exercises
- Standing marching, limited range
- Step-ups
- Add standing hip flexion w/resistance bands, if tolerated
- Begin 7-Way Hips, focus on abductor strengthening
- Clamshells
- Week 8
  - Add SLR if no pain

Modalities:
- *Important to address common tendon pain areas – psoas, recuts, TFL, abductors
  - Heat to begin session
  - Stim, laser as needed
  - Manual modalities, graston, dry needling if needed

Physical Therapy Weeks 10-12:

Weight bearing:
- Week 10: ambulating normally without assistive device, no limp
- Progress walking endurance

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Range of Motion:
- Achieve and maintain full passive and active range of motion
- Continue hip joint mobilization as indicated

Exercises:
- Continue closed chain exercise progression
- Advance bridging program
- Advance core stabilization
- Initiate
  - More aggressive strengthening against resistance
  - Seated hip internal and external rotation with theraband resistance
  - Total Gym/Leg press avoiding full depth
  - Single leg balance and proprioception
  - Side-stepping w/Tband
  - Squats w/T-band

Late Rehabilitation Phase IV:
Goals:
- No muscular or joint pain
- Return to full ADL function
- Restore full strength, endurance, and neuromuscular control
- Return to desired level of activity/sport

Physical Therapy Weeks 12-16:
Range of Motion:
- Maintenance of full passive and active range of motion

Exercises:
- Week 12: Initiate straight line interval jogging (may begin earlier if Alter-G available, and no pain, good strength and full ROM)
  - Progress to continuous jogging if radiographs clear and progressing well in PT
  - No twisting or cutting
- Progress resistance with exercises listed above through full range and depth
- Initiate:
  - Elliptical
  - Eccentric loading
  - Multi-directional lunges
  - Band walks, various tempo
  - Progress dynamic balance
  - Lateral Stepdown
  - Front Step down
  - Back squats
  - Slide board exercises
  - Deadlifts
**Physical Therapy 4 months +:**

- Progress to cutting/pivoting once able to control eccentric deceleration with straight line running
- Continue aggressive strengthening
  - Side planks
  - Resisted abduction
  - 7-Way Hips
  - Squats w/Tband
  - Begin single-leg work
- Initiate plyometrics forward and lateral
- Initiate Sport specific drills
- Enhance cardiorespiratory fitness

**Physical Therapy 6 months +:**

- Functional Testing to Consider:
  - Side plank for 60 seconds
  - Single Leg Balance for 30 seconds (eyes open/eyes closed)
  - Unilateral leg press test at half body weight for 30 seconds
  - Broad jump for distance
  - Unilateral step-down test
  - Single leg hop for distance
  - Triple hop for distance
  - 6 meter hop for time
  - Crossover hop for distance
  - Star Excursion Balance Testing

***Discharge/release to full activity and sport will ultimately be up to the surgeon with valuable input from the rehabilitation team and patient reported outcomes

**Goals:**

1. Painless full ROM
2. Healed osteotomy sites
3. Strength ~ 85% of contralateral side
4. Met all PT milestones to date
5. Pass both frontal, lateral and pivoting assessments with good control