Children's Hospital of Philadelphia℠
Sports Medicine & Performance Center

Wudbhav Sankar, MD

Periacetabular Osteotomy (PAO) Protocol
Revised 2023

*****Please refer to written prescription for any special instructions for each case*****

This protocol serves as a guideline for controlled progression back to physical activity. Modifications may be made by the surgeon depending on the exact surgical procedure performed. **Extra caution needs to be given to the psoas muscle to reduce the risk of tendonitis.**

Weeks 1 to 4:

Precautions:

- ROM restrictions
  - Hip flexion: 20-90°
    - May sit statically with 90°, avoid prolonged static sitting > 1 hour
  - Adduction/Abduction: 20°/20°
  - External rotation: 20° in 90° of hip flexion
  - Internal rotation: 10° in 90° of hip flexion
- No antigravity hip flexion
  - Monitor for hip flexor tendonitis
- Weight-bearing: 25% FFWB
- Limit hip abductor activation
- Avoid prone lying
- No formal outpatient PT until surgical follow-up (typically at 4 weeks)

Goals:

- Patient and parent education prior to discharge from inpatient stay
  - ROM restrictions
  - Exercise program – Instruct and educate patient and family on exercises listed below for first month post-op or until follow-up with surgeon
  - Mobility
    - Bed mobility – out of bed to chair once epidural is removed (usually 2 days post-op)
    - Review use of assistive device to maintain 25 % FFWB (bilateral axillary crutches or walker)
    - Caregiver training for assistance with mobility
  - Positioning – For comfort and to promote neutral alignment at lower extremities
  - Equipment needs
    - Assistive device for mobility – bilateral axillary crutches/walker
    - CPM when indicated by surgeon
      - Knee CPM 4-6 hours per day. Parameters determined by surgeon. Goal is to promote 20-90° of hip flexion
    - Other considerations based on patient presentation
      - Rental wheelchair (reclining back versus standard)
      - Shower chair and/or adjustable height (3 in 1) commode, which can be used as both commode and shower chair

- Functional mobility
    - Transitional movements - Assess mobility in standing once cleared by surgeon, usually 2-3 days post-op, but it is dependent upon stability of repair
    - Normalize gait with assistive device
- Patient compliance with activity modification

Interventions:

- Gait Training
- Isometric quad/glute/hamstring sets
- Short arc quad
- Ankle pumps
- Seated calf raises (consider hip flexion ROM precautions- no hip flexion >90°)
- Abdominal bracing in supine
- Home exercise program

Weeks 4 to 6: (Initial PT evaluation after follow-up with surgeon, typically at 4 weeks post-op)

Precautions:

- ROM restrictions often removed at 4-6 weeks post-op
- No antigravity hip flexion until at least 8 weeks post-op (no SLR)
    - Monitor for hip flexor tendonitis
- Weight-bearing: Continue 25% FFWB and use of assistive device, unless instructed otherwise by surgeon

Goals:

- Initiate gravity eliminated therapeutic exercises (avoid active hip flexion until 8 weeks post op)
- Initiate prone lying if cleared by surgeon

Interventions:

- ROM/Flexibility:
    - Supine low load prolonged stretch to psoas with pillow(s) under hips
    - Heel slides (knee/hip flexion AAROM)
    - Bent knee fall outs
    - Hip abduction and adduction AROM
    - Stool hip rotations: internal and external rotation
- Strength
    - Isometric hip abduction/adduction
    - Long arc quads/seated resisted hamstring curl
    - Abdominal bracing: supine and prone (quadruped)
    - Double leg squats, bridges and heel raises (once cleared to progress to WBAT)
- Manual therapy:
    - Psoas release
    - Scar Mobilization/Massage - caution that position of screws may lead to discomfort
- Aquatics (as available, if surgical incision has healed): chest deep or waist deep water (no greater than 50% weight bearing); patients may begin walking (forward/backward, sidestepping) and standing therapeutic exercises
- Review Home Exercise Program

Weeks 6 to 12:

Precautions:

- Continue to watch for hip flexor tendonitis
- Weight-bearing: 25% FFWB → WBAT once cleared by surgeon (usually around 8 weeks)
    - Gradually wean to single crutch (start with household distances, progress to community/school)

- Continue to use assistive device until ambulating with good lower extremity symmetry – no trunk lean, pelvic drop, or Trendelenburg

Goals:

- Normalize Gait
- Obtain functional hip ROM
- Initiate antigravity hip flexion at 8 weeks post-op
  - Gradually progress with hip flexor resistance as tolerated
- Improve core strength, lower extremity muscle strength and balance/proprioception

Interventions:

- Continue ROM exercises as needed
- Initiate stationary bike with elevated seat and no resistance (6-8 weeks)
- Low impact aerobic endurance exercise (stationary bike, elliptical (10-12 weeks), walking program)
- Isolated strengthening:
  - Hip 4 way with abdominal bracing
  - Side-lying clamshell
  - Knee extension/hamstring curls
  - Core strengthening
- Functional strengthening
  - Bilateral → unilateral squats, leg press, bridges, heel-raises
  - Step-up/down, lunges, side stepping with band
  - Standing hip strengthening/stability exercises (once full WB)
- Balance/proprioception

Weeks 12 to 20:

Precautions:

- Continue to monitor for hip flexor tendonitis

Goals:

- Progress functional strengthening
- Incorporate core stability with single limb activities
- Restore/improve baseline single leg balance and motor control with functional activities

Interventions (in addition to those listed in previous weeks):

- Increase low impact aerobic endurance with stationary bike, elliptical or walking program (speed, duration, resistance levels)
- Progress functional strengthening exercises as tolerated, with good neuromuscular control (increase sets/repetitions, speed, resistance/weights, varying surfaces)
- Advance hip/core strengthening exercises (incorporate into functional strengthening)
- Improve single leg balance (static/dynamic, various surfaces, eyes closed)

CRITERIA TO ADVANCE TO IMPACT LOADING

- **Surgeon clearance**
- **Symmetrical gait pattern**
- **Near full symmetrical hip ROM in all directions**
- **Bilateral hip strength** of ≥ 75% limb symmetry with isometric handheld dynamometry
- **Lateral step-down test (Set step height to achieve ~60° knee flexion):** ≤ 3/6 errors
- **Y balance test (anterior reach only):** ≤ 4 cm difference as compared to uninvolved limb

Weeks 20 to discharge:

Goals:

- Initiate return to running progression once above criteria have been met
- Initiate jumping (double-leg to single-leg)
- Improve neuromuscular control and dynamic stability
- Improve muscular strength, power and endurance
- Begin gradual and progressive sport specific activities
- Promote sport specific fitness and prepare athlete for return to sport progression

Interventions (in addition to those listed in previous weeks):

- Advanced lower extremity/core strength and balance/proprioception exercises
- Running Progression
    - Gradually advance with straight ahead running on level surfaces/treadmill
    - Focus on a pain free and symmetrical gait pattern
- Plyometric Progression
    - Begin with double-leg jumps, focusing on soft/symmetrical landings
    - Progress double-leg jumps (height/distance, multiple jumps in same direction, varying surfaces, hopping over/onto objects)
    - Advance to single-leg jumps once patient demonstrates good and symmetrical neuromuscular control with all double leg jumping and single leg squats (progress to multi directional when appropriate)
- Sport specific cutting/pivoting drills
- High intensity aerobic/anaerobic training (progress resistance, speed, time)
- Educate on final home exercise program and injury prevention program
- Gradually advance back to sport/full activity after meeting criteria below

CRITERIA FOR RETURN TO SPORT/FULL ACTIVITY

- **Surgeon clearance**
- **Symmetric and full hip strength** at ≥ 85% limb symmetry with isometric handheld dynamometry
- **Lateral step-down test (Set step height to achieve ~60° knee flexion):** ≤ 1/6 errors
- **Y balance test (all directions):**
    - Composite score ≥ 90% (each side)
    - ≤ 4 cm difference for anterior reach, ≤ 6 cm difference for posteromedial and posterolateral reach as compared to uninvolved limb
- **Functional hop testing battery:** ≥ 85% limb symmetry, pain free and good neuromuscular control

Once return to sport criteria are met, the patient will be advised to follow a specific and gradual return to sport progression program which will be provided by surgeon or physical therapist.

Sports Medicine and Performance Center at the Children's Hospital of Philadelphia

Specialty Care Center in King of Prussia
550 South Goddard Blvd
King of Prussia, PA 19046
215-590-6919

Specialty Care Center in Chalfont
500 W Butler Pike
Chalfont, PA 18914
215-590-6930

Buerger Center for Advance Pediatric Care
3500 Civic Center Boulevard
Philadelphia, PA 19104
215-590-5819

Specialty Care at Virtua
200 Bowman Dr. Suite D-260
Voorhees, NJ 08043
215-590-6919

This protocol is designed to be administered by a licensed physical therapist and/or certified athletic trainer. Please do not hesitate to contact our office should you have any questions concerning the rehabilitation process.