

Appendix.

Table 2. Rehabilitation Protocol for Non-operative Management of Athletic Pubalgia (with/without Corticosteroid Injection)

In-Season	Week	Post-Season
<ul style="list-style-type: none"> Rest (injected) structures 	<p>Week 1-2</p>	<ul style="list-style-type: none"> Rest (injected) structures
<ul style="list-style-type: none"> Range of motion lumbar and bilateral hip joints Gluteal muscle and anterior pelvic stabilization: <ul style="list-style-type: none"> Hip Hikes Abdominal bracing in hook lying Front and side planks Quadruped alternating upper and lower Extremity on compliant and non-compliant surfaces Stationary bike without resistance 	<p>Week 3</p>	<ul style="list-style-type: none"> Range of motion lumbar and bilateral hip joints Gluteal muscle and anterior pelvic stabilization: <ul style="list-style-type: none"> Hip Hikes Abdominal bracing in hook lying Front and side planks Quadruped alternating upper and lower Extremity on compliant and non-compliant surfaces Stationary bike without resistance
<ul style="list-style-type: none"> Continue week 3 exercises Flexion only straight leg raises; progress to multiplane Supine hip extension with knee at 0 and 90 degrees Single leg balance exercises Bridging Wall squats at 45 and 90 degrees 	<p>Week 4</p>	<ul style="list-style-type: none"> Continue week 3 exercises Flexion only straight leg raises; progress to multiplane Supine hip extension with knee at 0 and 90 degrees Single leg balance exercises Bridging Wall squats at 45 and 90 degrees
<ul style="list-style-type: none"> Resistance walking, pushing, pulling Return to running/jumping program (single plane) Box jumps Tilt board, agility ladder and BOSU drills 	<p>Week 5</p>	<ul style="list-style-type: none"> Continue weeks 3-4 exercises
<ul style="list-style-type: none"> Progress core stabilization exercises Increase resistive exercise as tolerated Initiate sport specific exercise program 	<p>Week 6</p>	<ul style="list-style-type: none"> Continue weeks 3-4 exercises

Table 3. Rehabilitation protocol after surgical repair of athletic pubalgia, Phase I

Day 1 through Week 2: Rest, tendinous healing, and remodeling

Goals:

- Protect surgical site
- Wound care
- Pain control
- Edema reduction
- Improve soft tissue flexibility
- Restore normal passive hip range of motion
- Educate patient on precautions, restrictions, and plan of care

Rehabilitation:

- Gentle passive ROM to bilateral hip joints; avoid painful end-ranges and excessive hip abduction and extension, which stress the surgical sites
- Joint mobilization of the lumbar spine grade II-III for pain control and lumbar mobility
 - Hip anterior glide mobilization in supine
 - Hip posterior glide mobilization in supine
 - Central lumbar mobilization
 - Anterior ilium rotation mobilization
 - Posterior ilium rotation mobilization
- Soft tissue mobilization of lumbar paraspinal muscles
- Scar mobilization as soon as incision sutures are removed; deep transverse friction massage, instrument-assisted soft tissue mobilization
- Stationary bike without resistance, avoid trunk hyperextension
- Patient education for pelvic neutral in sitting and standing
- Restore normal walking gait patterns
- Avoid activities which increase intra-abdominal pressure
- No lifting or other activities that increase abdominal pressures
- Ice 15 minutes every 2-4 hours for the first 24-48 hours

ROM, range of motion.

Table 4. Rehabilitation protocol after surgical repair of athletic pubalgia, Phase II

Week 3-4: Continue to increase hip ROM, core strength, improve biomechanics

Goals:

- Target strengthening and neuromuscular reeducation with a focus on timing and recruitment patterns during functional movements
- Identify muscle imbalances, postural deviations, and muscular compensations
- Advance core strength and stability
- Advance cardiovascular training

Rehabilitation: Monitor patient pain levels and progress as tolerated

- Stretching to increase and restore flexibility of all lower extremity muscle groups including hamstrings, adductors, gluteal muscles, hip flexors, ankle dorsiflexors,

and quadriceps

- Core strengthening/core stability exercises with emphasis on gluteus medius, gluteus maximus, transversus abdominis (TA), and multifidus
 - Isometric abdominals with focus on TA and obliques to facilitate TA recruitment; start in supine and progress to quadruped, kneeling and half-kneeling positions
 - Dead bugs
 - Glute bridges progressing to glute bridges with resistance bands
 - Front and side planks
 - Double -and single-leg bridging
 - Rocker board drills
- Progressive resistive exercises
 - Straight-leg raises for hip flexors
 - Wall squats for hamstrings and quadriceps
 - Heel raises for gastroc/soleus
 - Lateral band walks for hip abductors; maintain lumbar neutral control
 - PNF diagonals with sport cord
 - Cross-band core work initiated in supine and progressed to standing
- Straight plane motion in weightbearing
 - Forward lunges (avoid deep lunges)
 - Single-leg dead lifts
 - Leg presses
 - Wall slides at less than 90 degrees progressing to 90 degrees while extending hold times
 - Step ups and step downs; focus on eccentric quad control and proper pelvic alignment
- Proprioceptive training
 - Single-leg balance exercise to include cone taps, single-leg ball toss
 - Exercises on unstable, noncompliant surfaces such as foam pads, tilt board, BOSU ball
 - Balance reach exercises with both lower and upper extremities
 - Single- and multi-plane wobble board drills
- Cardiovascular training
 - Continue with seated or recumbent bike adding resistance in pain free intensities; seated recruits gluteals more than the recumbent bike
 - Elliptical (pain free)
 - Stable surface or treadmill walking

PNF, proprioceptive neuromuscular facilitation; ROM, range of motion.

Table 5. Rehabilitation protocol after surgical repair of athletic pubalgia, Phase III

Week 5-8: Return to sports/plyometric exercises

Goals:

- Prescribe sport specific movements and speeds to prepare and strengthen the involved tissue

for the forced couples created during sport-specific movements

- Progress to running on uneven surfaces progressing to an intensity required for specific sport
- Return to full play without pain

Rehabilitation: Exercise in all 3 planes of motion. Implement return to running and sports-specific activities in both open and closed kinetic chain. Monitor patient pain levels and progress as tolerated.

- Core strengthening/core stability exercises
 - 3-way planks
 - Prone physioball walkouts
 - Dynamic planks
 - Resisted core exercise utilizing medicine balls, sports cords, weights
 - Advanced cross-band resisted core exercises
- Triplane weightbearing exercises
 - Forward and lateral lunges
 - TRX/Rip 60 double- and single-leg squats
 - Resisted band ambulation forward, backward, and lateral
 - Speed skaters progressing to resisted speed skaters
 - Slide board drills
- Proprioceptive training
 - Sport cord arcs
 - Sport forward and backward shuffles
 - Single leg ladder drills
 - Single leg BOSU drills
- Cardiovascular training
 - Return to running on even, flat ground
 - Line jumps/box jumps
 - Progress to running on uneven surfaces progressing to an intensity required for specific sport
 - Sport-specific sprinting, endurance running, changes in direction
 - Ladder drills
 - High knees, butt kicks, bounding, high skipping, bear crawls
- Plyometric exercises
 - BOSU drills
 - Box jumps
 - Medicine ball tosses/lunges
 - Weighted rope drills
 - Cone drills
- Agility drills
 - Straight running at a steady pace, 20-30 minutes
 - High-knee drills
 - Lateral running in crouched position
 - Backward running
 - Vertical jumping
 - Stair climbing

- o Carioca drills
 - o Line touch drills
 - o Figure-eight running
 - o Run and cut
 - Sport-specific drills to include:
 - o Court sports: vertical leaping, box out drills, initiate plant/pivot, change direction, stop/start
 - o Soccer: cone dribbling, initiate plant/pivot, change directions, stop/start, increase training/sprinting
 - o Hockey: slide board drills with and without stick, initiate start/stop, skating practice drills with team, shooting
 - o Football: plant/pivot, change directions, short sprints, long sprints, lateral bounds, squat jumps, cross-over drills
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