

HIP ABDUCTOR (GLUTEUS MEDIUS/MINIMUS) REPAIR CLINICAL PRACTICE GUIDELINE

Background

Gluteus medius and/or minimus partial- or full-thickness tears can be the source of significant functional impairments and chronic peritrochanteric hip pain. These tears are similar in morphology to the soft tissue anatomy of rotator cuff tears in the shoulder (Domb 2013). Often, gluteus medius and/or minimus tears do not have a clear mechanism of injury; however, it is thought that the progression of these tears is gradual with degradation that occurs within the musculotendinous junction and at its attachment to the bone. These changes eventually cause insertional failure and tendinopathy that leads to partial undersurface tearing. Occasionally, these tears progress to complete avulsion of the abductor attachment on the greater trochanter (Domb 2013). Gluteus medius tears are more common than gluteus minimus tears and partial thickness tears are more common than full thickness tears (Connell 2003). Lastly, women more commonly demonstrate symptomatic tears compared to men (Tibor 2008). Many of these tears often go undiagnosed or misdiagnosed for a prolonged time. Hip abductor repair is most commonly an open procedure in order to best expose the tissues and fully perform the repair. Due to the nature of the repair, certain precautions must be taken early on during post-operative rehabilitation in order to protect the repaired and healing tissues.

The surgical procedure involves an incision over the lateral aspect of the hip carried down to the iliotibial (IT) fascia. The IT fascia is opened longitudinally and the trochanteric bursa is removed or debrided. The gluteal tendons are then identified and cleaned. Anchors are placed into the greater trochanter and the stitches are used to secure the gluteal tendons back to the bone. The IT fascia is partially closed with the extent of closure dependent on presentation. The wound is closed through the deep soft tissues and the skin.

Disclaimer

Progression is time and criterion-based, dependent on soft tissue healing, patient demographics, and clinician evaluation. Contact Ohio State Sports Medicine at 614-293-2385 if questions arise.

Summary of Recommendations

Precautions (6 wks)	<ul style="list-style-type: none"> • WB restrictions: 50% WB w/ walker or crutches • Hip abduction brace when OOB • No flexion > 90° and no adduction past neutral/0° 	
Corrective Interventions	<ul style="list-style-type: none"> • Proper activation and recruitment of all hip and core musculature without compensation required prior to initiating strengthening • Neuromuscular re-education for balance and correction of functional movement patterns • Therapeutic exercise and neuromuscular re-education for LE strength (progressing from DL to SL activities) 	
ROM/Manual Therapy	<ul style="list-style-type: none"> • PROM as tolerated <ul style="list-style-type: none"> ◦ No hip flexion > 90° and no adduction past neutral/0° (6 wks) • No AROM hip abduction, ER, or IR (6 wks) 	
Outcome Testing	<ul style="list-style-type: none"> • Pre-op, evaluation, 6 wks, and discharge <ul style="list-style-type: none"> ◦ May increase frequency if warranted • Hip Outcome Score (HOS) <ul style="list-style-type: none"> ◦ ADL (17 items) ◦ Sports (9 items) 	
Criteria for Progression	<p><i>To Initiate Plyometric Program</i></p> <ul style="list-style-type: none"> • Full, functional, pain-free ROM • > 80% quadriceps, hamstring, and hip (using hand-held dynamometer) strength compared to uninvolved leg • Squat > 150% BW (barbell squat or leg press) • 10 forward and lateral step downs from 8" step with proper mechanics 	<p><i>To Initiate Running Program</i></p> <ul style="list-style-type: none"> • Pass all plyometric program criteria • Hop and hold with proper mechanics (uninvolved → involved) • Ability to tolerate 200-250 plyometric foot contacts without reactive pain/effusion • No gross visual asymmetry and rhythmic strike pattern with treadmill or over ground running
Criteria for Return to Sport/Discharge	<ul style="list-style-type: none"> • Physician clearance at last check-up • Strength: > 90% compared to uninvolved hip (using hand-held dynamometer) • > 90% BW with SL leg press • Functional Performance: <ul style="list-style-type: none"> ◦ > 90% limb symmetry with SL hop for distance, SL triple crossover hop, and SL 6-meter timed hop (with demonstration of proper LE landing mechanics) ◦ Ability to complete sport-specific drills with correct mechanics - at maximum speed w/o pain • Patient reported outcome measures: <ul style="list-style-type: none"> ◦ Score ≥ 90% on HOS (ADL and Sports subscales) <p>** Criteria for discharge from PT is less rigorous for those not returning to sport. Ensure the patient is able to perform all ADLs and recreational activities without pain, reactive effusion, and with appropriate functional mechanics.**</p>	

Abbreviations: AD, assistive device; ADLs, activities of daily living; AROM, active range of motion; BW, body weight; DL, double leg; LE, lower extremity; PROM, OOB, out of bed; passive range of motion; pre-op, pre-operative; ROM, range of motion; SL, single leg; WB, weight bearing; wks, weeks

Phase I: Protection - Post-Op until D/C Assistive Device (0-6 weeks)

Goals	<ul style="list-style-type: none"> • Protect healing tissues • Pain and edema control • Improve pain-free ROM • Normalize muscle activation • PT Frequency: recommend 1x/week starting at week 2 or per MD instruction
Precautions	<ul style="list-style-type: none"> • 50% weight bearing with crutches or walker for 6 wks • Use hip abduction brace when OOB for 6 wks • No hip flexion > 90° and no hip adduction past neutral/0° • No active hip abduction, ER, or IR ROM for 6 wks • Avoid sidelying position when sleeping • Avoid irritation of lateral hip pain • Avoid sitting > 30 minutes at a time to avoid hip flexor tightness <ul style="list-style-type: none"> ○ Instruct to keep hips above knees (i.e. > 90° hip flexion)
ROM/Stretching	<ul style="list-style-type: none"> • PROM (painfree): Hip flexion, extension, abduction, prone hip IR and ER <ul style="list-style-type: none"> ○ Limit hip flexion to 90° and hip adduction to 0° for 6 weeks • Stretches: prone quadriceps, supine iliopsoas (uninvolved knee to chest) • Soft tissue mobilization as warranted (adductors, TFL, hip flexors, etc.) • GENTLE scar mobilizations can begin after incisions closed • Upright bike for ROM (raise saddle height so that hip flexion is 90° or less)
Neuromuscular Control	<p>this section is 1st priority → do not progress to strengthening until pt is able to perform isolated muscle activation</p> <ul style="list-style-type: none"> • Gluteal muscle activation without compensation (prone, supine, seated), transverse abdominis (TA), quadriceps
Therapeutic Exercises	<p><u>Early Exercises (wks 0-3):</u></p> <ul style="list-style-type: none"> • Hip adductor isometrics (not past neutral), prone hamstring curls, seated knee extension, TA progression in hooklying (respecting ROM precautions) <p><u>Advanced Exercises (wks 4-6):</u></p> <ul style="list-style-type: none"> • Criteria to begin this section: minimal reactive pain and edema <ul style="list-style-type: none"> ○ Flexion/extension SLR, quadruped cat/camel, quadruped weight shifts, DL bridges, standing TKE (with AD) ○ Gradually increase resistance on stationary bike as tolerated ○ Initiate hip abduction and ER isometrics at 4 weeks <ul style="list-style-type: none"> ▪ Begin with 50% MVC and progress as tolerated) ○ Recommend iliopsoas progression at 4 weeks if poor lumbopelvic control persists (Appendix A) ○ Aquatic therapy may be appropriate and can be initiated once incision is well-healed and patient is cleared by physician
Criteria to Progress to Phase II	<ul style="list-style-type: none"> • Normalized gait pattern with AD • Minimal to no reactive pain and swelling with ADLs and PT exercises • Muscle activation and isolation is normalized • Pass the Prone Hip Extension Test (Appendix B) <ul style="list-style-type: none"> • 10 repetitions • Proper gluteal muscle activation (gluteus maximus 1st, hamstrings 2nd) • Leg extends 10° past neutral

Phase II: D/C Crutches to Painfree with ADLs (6-8 Weeks)

Goals	<ul style="list-style-type: none"> • Progress to full PROM and AROM in all directions • Progressively improve strength of the proximal hip musculature (gluteals, iliopsoas, hip rotators) • Normalize postural/lumbopelvic control with DL and SL activities • Normalize gait at preferred walking speed for community distances without AD • Tolerate ADLs without pain or limitation
Precautions	<ul style="list-style-type: none"> • Avoid soft tissue aggravation due to early/excessive progression of activity <ul style="list-style-type: none"> ○ Soft tissue irritation suggests need for regression of activities and/or exercises • Avoid aggressive stretching into hip adduction/IR/ER including ITB stretches • Avoid running or impact activities • Continually assess patient's current activity level outside of PT
Crutch Progression	<ul style="list-style-type: none"> • 2 crutches or walker for 6 weeks • 2 → 1 crutch or cane → 0 recommended to slow patient progression, limit walking distance, and reduce stress through repaired tissue <ul style="list-style-type: none"> ○ 2 crutches → 0 recommended to promote normalized gait mechanics IF patient is unable to demonstrate appropriate mechanics with 1 crutch or cane
Criteria for Ambulation Without Assistive Device	<ul style="list-style-type: none"> • Adequate hip ROM for normalized/pain free gait pattern (10° hip extension) • Normalized gait pattern without AD <ul style="list-style-type: none"> ○ No Trendelenburg sign demonstrated during stance phase of gait
ROM/Stretching	<ul style="list-style-type: none"> • Soft tissue and joint mobilization to achieve symmetrical PROM • Upright bike, butterfly/reverse butterfly stretches • May benefit from referral to massage therapist if patient is developing soft tissue dysfunction/irritation (commonly affects TFL, adductors)
Therapeutic Exercise	<ul style="list-style-type: none"> • DL squat, leg press, calf raises, forward/lateral step ups, 4 way hip (standing), SL balance (focus on pelvic stabilization), bridge progression, quadruped progression (UE/LE lifts) • Hip rotation AROM (ER/IR) with involved knee on stool
Cardiovascular Exercise	<ul style="list-style-type: none"> • May progress time on upright bike as tolerated • Ensure patient can perform 30 minutes with no resistance and without symptoms prior to adding resistance • Decrease time to ≤15 min when adding resistance • Appropriate to recommend freestyle or backstroke swimming at end of phase II <ul style="list-style-type: none"> ○ MUST use a pull buoy to allow legs to rest in a neutral position (no kicking allowed) <ul style="list-style-type: none"> ▪ Use buoy at highest point between legs
Criteria to Progress to Phase III	<ul style="list-style-type: none"> • Symmetrical and pain free hip ROM to meet the demands of patient's activities • Symmetrical DL squat to 70° of knee flex • Score of 0-1 performing 10 repetitions of Active Hip Abduction Test (Appendix C) • 10 repetitions of 8" step downs with good neuromuscular control • Normalized gait pattern for community distances of ambulation <ul style="list-style-type: none"> ○ No compensatory movement patterns at pelvis (no Trendelenburg sign)

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

Goals	<ul style="list-style-type: none"> • Gradually progress gluteus medius/minimus strength and core/proximal hip stability • Correct abnormal or compensatory movement patterns with functional tasks • Optimize neuromuscular control, balance, and proprioception • Increase volume and intensity of non-impact aerobic activities
Precautions	<ul style="list-style-type: none"> • Avoid secondary muscle irritation (hip flexor and lateral hip) • Monitor ROM, quality of movement, and activity level
ROM/Stretching	<ul style="list-style-type: none"> • Maintain full AROM/PROM and progress through multidirectional end range movements as required for vocational or recreational activities • Use manual techniques including STM and joint mobilization as needed for soft tissue and joint tightness • Address any persistent lumbar or pelvic dysfunctions with manual or stretching interventions
Therapeutic Exercise	<ul style="list-style-type: none"> • Gradually progress gluteus medius/minimus strength <ul style="list-style-type: none"> ○ Progressive resisted hip abduction and IR/ER strengthening in NWB and WB positions • Continue progressive LE/core strength and stability <ul style="list-style-type: none"> ○ Begin to address multiplanar movements near end of phase III • Balance/Proprioception <ul style="list-style-type: none"> ○ Rocker board, BOSU ball, SLS on foam pad
Cardiovascular Exercise	<ul style="list-style-type: none"> • Upright Bike/Elliptical/Stairmaster Progression (see return to biking protocol) <ul style="list-style-type: none"> ○ Gradually progress resistance and/or speed (cross ramp on elliptical) as tolerated • Swimming Progression (see return to swimming protocol) <ul style="list-style-type: none"> ○ Return to freestyle and backstroke kicking but NO use of kickboard ○ May also return to elementary backstroke (slowly) and dolphin dives
Plyometrics	<ul style="list-style-type: none"> • Criteria to initiate plyometric program <ul style="list-style-type: none"> ○ Full, functional, pain-free ROM ○ > 80% quadriceps, hamstring, and hip (using hand-held dynamometer) strength compared to uninvolved leg ○ Squat 150% BW (barbell squat or leg press) ○ 10 forward and lateral step downs from 8" step with proper alignment (Appendix D) • Progressive weight bearing, DL → SL demands <ul style="list-style-type: none"> ○ Shuttle plyometrics (DL → SL) ○ Forward hop and hold (uninvolved → involved) ○ DL mini hops/place jumps • Proper take off/landing mechanics emphasized → NO knee valgus, good pelvic stability, soft/quiet landing with equal distribution of force • Agility ladder can be initiated if appropriate form and tolerance to plyometrics

Return to Running

Walk/jog progression can be initiated towards end of phase if patient demonstrates:

- Full, functional, pain-free ROM
- > 80% quadriceps, hamstring, and hip (using hand-held dynamometer) strength compared to uninvolved leg
- Squat 150% BW (barbell squat or leg press)
- 10 forward and lateral step downs from 8" step with proper alignment (see appendix D)
- Hop and hold with proper mechanics (uninvolved→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 over ground running

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	<ul style="list-style-type: none">• Jog every other day until able to run 30 consecutive minutes• Begin with 5 min walking warm up• End with 5 min walking cool down	

General Guidelines

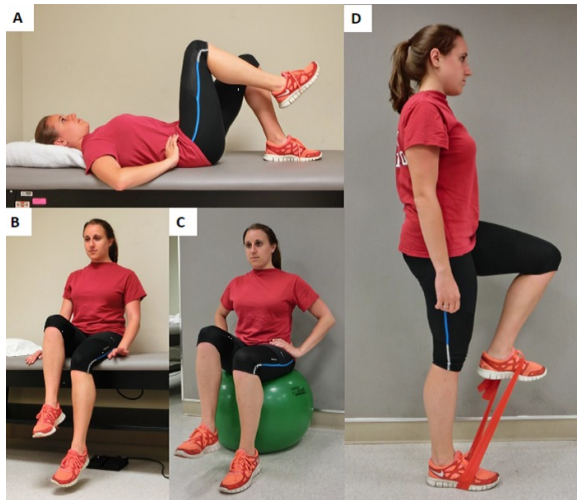
- To complete each phase, follow the Total Time guidelines below.
 - 10 minutes x2 sessions
 - 15 min x1 session
 - 20 min x1 session
 - After completing any phase pain free for 20 minutes, patient is appropriate to move forward to next phase
- Allow at least one day of rest between runs
- Gradual increase in distance is priority before increased pace
- It is common for runners to experience increased pain and/or reactive edema at least x1 during this return to run progression. When pain occurs, runner must stop running immediately and rest at least 1 day before restarting program. With restart, perform last walk/jog ratio cycle completed painfree 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 to 6+ Months)

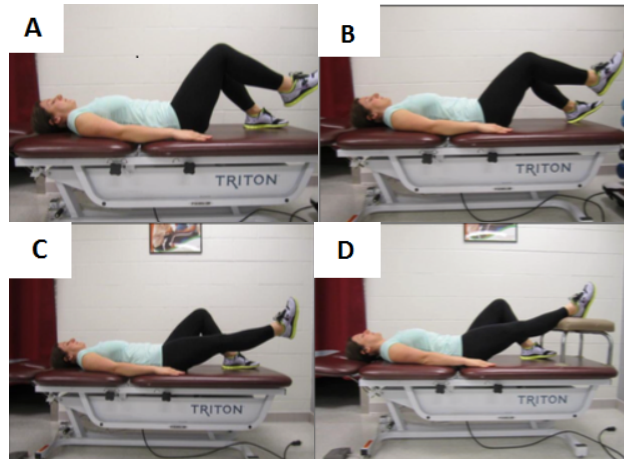
Goals	<ul style="list-style-type: none"> • Initiate return to run program if not initiated in phase III • Return to physically demanding job • Progressively return to sport or prior/desired level of function (4-6 months for full return to sport)
Precautions	<ul style="list-style-type: none"> • Continue to emphasize proper landing mechanics (DL and SL) • Avoid progression of plyometric exercises if increased pain <ul style="list-style-type: none"> ○ If yes, re-assess and address any underlying strength or neuromuscular impairments • Ensure patient maintains full flexibility and painfree ROM as strength continues to increase • Closely monitor return to sport progression
ROM/Stretching	<ul style="list-style-type: none"> • Continue ROM interventions and stretches from previous phases <ul style="list-style-type: none"> ○ Include multiplanar lumbar and hip ROM/flexibility • Emphasis on dynamic warm-up and stretching (i.e. walking lunges, hurdle steps, etc.) • Monitor sport-specific stretching with gradual return to end range stretching
Therapeutic Exercise	<ul style="list-style-type: none"> • Hip and core strengthening with focus on pelvic stability <ul style="list-style-type: none"> ○ Maintain DL strength but emphasize SL strengthening (involved and uninvolved) • Progress multiplanar movements (static to dynamic activities)
Neuromuscular Control and Functional Performance	<ul style="list-style-type: none"> • Progress agility and plyometrics by adding in higher level activities (i.e. forward/backwards hopping, side shuffles, carioca, cutting, box drills, T drills, tuck jumps, DL/ SL jump turns) • Focus on hip and pelvic stability <ul style="list-style-type: none"> ○ Incorporate unstable surfaces with plyometrics • Impact exercises: 2 feet to 2 feet → 1 foot to other foot → 1 foot to same foot <ul style="list-style-type: none"> ○ Single plane drills → multi-plane drills • Dynamic control exercise: low velocity, single plane activities → higher velocity, multiplanar activities • Continue to advance dynamic stability tasks (both endurance and multidirectional stability) • Sport specific drills in clinic (moderate speed → maximum speed) • Prior to initiating speed training, patient must first complete entire return to run program • Ensure tolerance with DL and SL plyometrics prior to initiating power-focused or resisted, explosive training
Cardiovascular Exercise	<ul style="list-style-type: none"> • Swimming Progression: return to freestyle and backstroke kicking • Able to use kickboard • May return to breaststroke and butterfly (one arm drills → double arm as able)
Return to Sport/Discharge	<ul style="list-style-type: none"> • Physician clearance at last check-up • Strength: > 90% compared to uninvolved hip (using hand-held dynamometer) • > 90% with SL leg press at body weight (# of repetitions to fatigue) OR >90% on Isokinetic testing with quad/hamstring ratio • Functional Performance <ul style="list-style-type: none"> ○ 90% limb symmetry with SL hop for distance, SL triple crossover hop, and SL 6-meter timed hop (with demonstration of proper LE landing mechanics) <ul style="list-style-type: none"> ➢ Crossover hop most important to ensure proper mechanics with increased lateral loading through hip • Ability to complete sport-specific drills with correct mechanics (at maximum speed without pain) • Patient reported outcome measures <ul style="list-style-type: none"> ○ Score ≥ 90% on HOS (ADL and Sports subscales)

Appendix A: Psoas Progression

Clinicians may choose either of the two iliopsoas strengthening progressions based on clinician/patient preference. All exercises are performed with simultaneous abdominal drawing in maneuver and lumbar spine in neutral alignment.



A) Supine short-lever hip flexion
 B) Seated hip flexion
 C) Seated hip flexion on Swiss ball
 D) Standing hip flexion with theraband resistance



A) Marching
 B) Walk Out
 C) Heel Slide
 D) Heel Slide with SLR

Tyler TF, Fukunaga T, Gellert J. Rehabilitation of soft tissue injuries of the hip and pelvis. *Int J Sports Phys Ther.* 2014;9(6):785-797.

Dewitt, JD. Non-surgical/post-op management. Presented at: APTA's NEXT Conference & Exposition; June 5, 2015; National Harbor, MD.

Appendix B: Prone Hip Extension Test

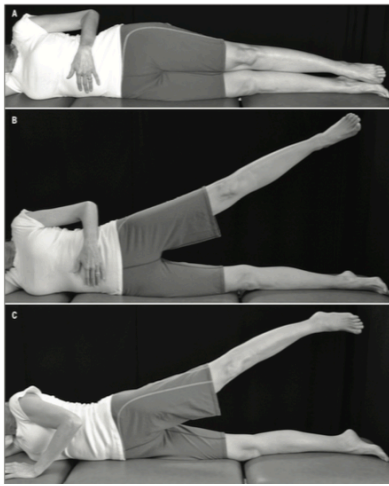
The prone hip extension test assesses ability to fire the gluteus maximus while maintaining lumbo-pelvic-hip control. Criteria to pass test:

- 10 repetitions
- Proper gluteal muscle activation (gluteus maximus 1st, hamstrings 2nd)
- Leg extends 10° past neutral
- No compensatory movement patterns at pelvis (no anterior pelvic tilt)
- No anterior hip pain



Appendix C: Active Hip Abduction Test

Score	Cues for Examiner
0	Able to maintain position of pelvis in the frontal plane
1	Minimal loss of pelvis position in the frontal plane
2	Moderate loss of pelvis position in the frontal plane
3	Severe loss of pelvis position in the frontal plane



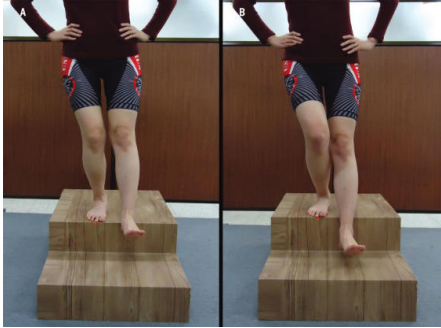
(A) Demonstration of the active hip abduction test from the starting position

(B) Demonstration of good control of the pelvis in the frontal plane; this would receive a score of 0. The alignment of lower extremities, pelvis and trunk has not changed from the start position, and upper extremity remains relaxed on the abdomen.

(C) Demonstration of poor control of the pelvis in the frontal plane; this would receive a score of 3. The upper extremity is placed on the table to prevent loss of balance, the pelvis has rotated forward and the top hip has flexed and internally rotated.

Davis, AM, Bridge P, Miller J, Nelson-Wong, E. Interrater and intrarater reliability of the active hip abduction test. *J Orthop Sports Phys Ther.* 2011;41(12):953-960.

Appendix D: Forward Step Down Test

Definition of errors	Interpretation of errors	
<p>Arm strategy: subject uses an arm strategy in an attempt to recover balance (1 point)</p> <p>Trunk movement: trunk leans right or left (1 point)</p> <p>Pelvic plane: pelvis rotates or elevates on one side compared to the other (1 point)</p> <p>Knee position: knee deviates medially and the tibial tuberosity crosses an imaginary vertical line over 2nd toe (1 point); knee deviates medially and the tibial tuberosity crosses an imaginary vertical line over medial boarder of the foot (2 points)</p> <p>Balance: subject steps down on the uninvolved side or the subject's tested leg becomes unsteady (1 point)</p>	0-1 errors	Good quality mechanics
	2-3 errors	Medium quality mechanics
	4+ errors	Poor quality mechanics

Park K, Cynn H, Choung S. Musculoskeletal predictors of movement quality for the forward step-down test in asymptomatic women. *J Orthop Sports Phys Ther.* 2013;43(7):504-510.

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Reviewers: John DeWitt, PT, DPT, SCS, AT, William Vasileff, MD; and John Ryan, MD

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