

Rehabilitation Protocol for Core Muscle Repair

This protocol is intended to guide clinicians through the post-operative course for a Core Muscle Repair. This protocol is time based (dependent on tissue healing) as well as criterion based. Specific intervention should be based on the needs of the individual and should consider exam findings and clinical decision making. The timeframes for expected outcomes contained within this guideline may vary based on surgeon’s preference, additional procedures performed, and/or complications. If a clinician requires assistance in the progression of a post-operative patient, they should consult with the referring surgeon.

The interventions included within this protocol are not intended to be an inclusive list of exercises. Therapeutic interventions should be included and modified based on the progress of the patient and under the discretion of the clinician.

Considerations for the Post-operative Core Muscle Repair

Many different factors influence the post-operative Core Muscle Repair rehabilitation outcomes, including complexity of surgery and structures repaired, chronicity of injury prior to surgery and pre-operative condition of the patient. It is recommended that clinicians collaborate closely with the referring physician regarding the above.

PHASE I: IMMEDIATE POST-OP (0-1 WEEKS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> • Pain control • Reduce swelling • Improve muscle length of pelvic girdle musculature • Improve Lumbar and hip range of motion (ROM)
Precautions	<ul style="list-style-type: none"> • Avoid lifting or other activities that increase intra-abdominal pressure (Valsalva)
Interventions	<p><i>Manual Therapy</i></p> <ul style="list-style-type: none"> • Peri incisional mobilization • Soft tissue mobilization (STM) along the adductor muscle group and associated pelvic musculature as needed • Passive range of motion (PROM) of the hip • Grade I-II lumbar and hip joint mobilizations as needed <p><i>Stretching</i></p> <ul style="list-style-type: none"> • Lumbar: trunk rotations • Adductor: figure 4 • Hip flexor: Thomas • Hip rotator: cross body • Hamstring: supine <p><i>Therapeutic Exercise</i></p> <ul style="list-style-type: none"> • Gluteal and quad sets • Ankle pumps <p><i>Cardiovascular:</i></p> <ul style="list-style-type: none"> • Walking (15 min, 2x/day at an easy pace) • Upper body ergometer (UBE)

Criteria to Progress	<ul style="list-style-type: none"> • 2 weeks post op • Minimal pain with activities of daily living (ADLs) and gait
-----------------------------	---

PHASE II: INTERMEDIATE POST-OP (2-3 WEEKS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> • Pain control • Reduce swelling • Introduce core strengthening progressions • Introduce proprioceptive progressions • Normalize muscle length of pelvic girdle musculature • Normalize lumbar and hip PROM
Precautions	<ul style="list-style-type: none"> • Avoid lifting or other activities that increase intra-abdominal pressure (Valsalva)
Additional Interventions <i>*Continue with Phase I interventions as appropriate</i>	<p><i>Manual Therapy</i></p> <ul style="list-style-type: none"> • Peri incisional mobilization • STM along the adductor muscle group and associated pelvic musculature as needed • PROM of the hip as needed • Grade III-IV lumbar and hip joint mobilizations as needed <p><i>Stretching</i></p> <ul style="list-style-type: none"> • Gentle stretching: Continue from previous phase or until ROM in normalized <p><i>Therapeutic Exercise</i></p> <ul style="list-style-type: none"> • Isometrics of the adductors: ball squeeze hip extended and hook lying • Transverse Abdominus (TrA) progressions • Quadruped Progressions • Bridge progressions • Side lying hip abduction • Straight leg raises (SLR) • Prone hip extension • Proprioception: Single leg balance progressions • Functional: squat, step up <p><i>Cardiovascular:</i></p> <ul style="list-style-type: none"> • Walking 30 minutes at moderate pace 1x/wk • Bike • Aquatic Treadmill (if available)
Criteria to Progress	<ul style="list-style-type: none"> • Full lumbar and hip ROM • Full adductor muscle length • Normal and pain-free gait • Pain-free ADLs • Pain-free therapeutic exercises

PHASE III: LATE POST-OP (4-5 WEEKS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> • Able to maintain good pelvic stabilization during core exercise program • Initiate Progressive resistive exercises (PRE)
Additional Interventions <i>*Continue with Phase I-II Interventions as appropriate</i>	<p><i>Stretching</i></p> <ul style="list-style-type: none"> • Continue as needed <p><i>Therapeutic Exercise</i></p> <ul style="list-style-type: none"> • Core: Continue above progressions, plank progressions • Concentric hip strengthening with PRE: 4 way standing • Concentric Rectus Abdominus (RA): straight and oblique crunch and full • Functional: Squat, Stepdown, Forward lunge, RDL with PRE • Proprioceptive: continue above progressions with airex <p><i>Cardiovascular:</i></p> <ul style="list-style-type: none"> • Elliptical
Criteria to Progress	<ul style="list-style-type: none"> • Pain-free exercises • 6 weeks post-operative

PHASE IV: TRANSITIONAL (6-8 WEEKS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> • Normalize strength • Initiate eccentric strengthening
Additional Interventions <i>*Continue with Phase I-III interventions</i>	<p><i>Stretching</i></p> <ul style="list-style-type: none"> • Continue as needed <p><i>Therapeutic Exercise</i></p> <ul style="list-style-type: none"> • Concentric RA: Full sit up straight and oblique • Eccentric Adductor: Copenhagen adduction progressions • Functional: Lateral lunge, slide board, adductor slides with PRE • Proprioceptive: Continue above progressions with BOSU <p><i>Cardiovascular:</i></p> <ul style="list-style-type: none"> • Return to jogging program
Criteria to Progress	<ul style="list-style-type: none"> • Pain-free jogging • Pain-free exercises • Hip index (flexion, abduction, adduction, extension) <20%

PHASE V: EARLY RETURN TO SPORT (9-12 WEEKS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> • Normalize strength • Initiate plyometric program • Initiate sprinting program • Initiate agility program
Additional Interventions <i>*Continue with Phase II-IV interventions as appropriate</i>	<p><i>Therapeutic Exercise</i></p> <ul style="list-style-type: none"> • Functional: Continue with PRE as previously defined • Medicine ball routine: chest pass, side to side pass, Overhead pass • Plyometric protocol • Agility protocol • Return to sprinting protocol
Criteria to Progress	<ul style="list-style-type: none"> • Clearance from MD and ALL milestones met • Completion of plyometric, sprinting and agility program • Functional Assessment: <ul style="list-style-type: none"> ○ Hip index (flexion, abduction, adduction, extension) $\geq 90\%$; HHD mean or isokinetic testing @ 60d/s ○ Adductor/Abductor ratio $>80\%$ using HHD (values for isokinetic have not yet been determined for return to sport criteria) ○ Hop Testing $\geq 90\%$ compared to contra lateral side, demonstrating good landing mechanics • HAGOS questionnaire $>90\%$

PHASE VI: UNRESTRICTED RETURN TO SPORT (3 MONTHS AFTER SURGERY)

Rehabilitation Goals	<ul style="list-style-type: none"> • Return to practice
Additional Interventions <i>*Continue with Phase II-V interventions</i>	<ul style="list-style-type: none"> • Return to practice/scrimmage • Multi-plane sport specific plyometrics program • Multi-plane sport specific agility program • Include hard cutting and pivoting depending on the individuals' goals • Non-contact practice → Full practice → Full play
Criteria to Progress	<ul style="list-style-type: none"> • Last stage, no additional criteria

Revised 12/2021

Contact	Please email MGHSportsPhysicalTherapy@partners.org with questions specific to this protocol
----------------	--

References

1. Becker LC, Kohlireser DA. CONSERVATIVE MANAGEMENT OF SPORTS HERNIA IN A PROFESSIONAL GOLFER: A CASE REPORT. :10.
2. Bisciotti GN, Chamari K, Cena E, et al. The conservative treatment of longstanding adductor-related groin pain syndrome: a critical and systematic review. *bs*. 2021;38(1):45-63. doi:10.5114/biolsport.2020.97669
3. Elattar O, Choi H-R, Dills VD, Busconi B. Groin Injuries (Athletic Pubalgia) and Return to Play. *Sports Health*. 2016;8(4):313-323. doi:10.1177/1941738116653711
4. Ellsworth AA, Zoland MP, Tyler TF. ATHLETIC PUBALGIA AND ASSOCIATED REHABILITATION. :11.
5. Emblom BA, Mathis T, Aune K. Athletic Pubalgia Secondary to Rectus Abdominis-Adductor Longus Aponeurotic Plate Injury: Diagnosis, Management, and Operative Treatment of 100 Competitive Athletes. *Orthopaedic Journal of Sports Medicine*. 2018;6(9):232596711879833. doi:10.1177/2325967118798333
6. Gaii Via A, Frizziero A, Finotti P, Oliva F, Randelli F, Maffulli N. Management of osteitis pubis in athletes: rehabilitation and return to training – a review of the most recent literature. *OAJSM*. 2018;Volume 10:1-10. doi:10.2147/OAJSM.S155077
7. Gill TJ, Wall AJ, Gwathmey FW, et al. Surgical Release of the Adductor Longus With or Without Sports Hernia Repair Is a Useful Treatment for Recalcitrant Groin Strains in the Elite Athlete. *Orthopaedic Journal of Sports Medicine*. 2020;8(1):232596711989610. doi:10.1177/2325967119896104
8. Harøy J, Thorborg K, Serner A, et al. Including the Copenhagen Adduction Exercise in the FIFA 11+ Provides Missing Eccentric Hip Adduction Strength Effect in Male Soccer Players: A Randomized Controlled Trial. *Am J Sports Med*. 2017;45(13):3052-3059. doi:10.1177/0363546517720194
9. Ishøi L, Sørensen CN, Kaae NM, Jørgensen LB, Hölmich P, Serner A. Large eccentric strength increase using the Copenhagen Adduction exercise in football: A randomized controlled trial: Strength increase using Copenhagen Adduction. *Scand J Med Sci Sports*. 2016;26(11):1334-1342. doi:10.1111/sms.12585
10. King E, Ward J, Small L, Falvey E, Franklyn-Miller A. Athletic groin pain: a systematic review and meta-analysis of surgical versus physical therapy rehabilitation outcomes. *Br J Sports Med*. 2015;49(22):1447-1451. doi:10.1136/bjsports-2014-093715
11. Rodriguez R. Measuring the Hip Adductor to Abductor Strength Ratio in Ice Hockey and Soccer Players: A Critically Appraised Topic. *Journal of Sport Rehabilitation*. 2020;29(1):116-121. doi:10.1123/jsr.2018-0250
12. Serner A, Jakobsen MD, Andersen LL, Hölmich P, Sundstrup E, Thorborg K. EMG evaluation of hip adduction exercises for soccer players: implications for exercise selection in prevention and treatment of groin injuries. *Br J Sports Med*. 2014;48(14):1108-1114. doi:10.1136/bjsports-2012-091746

13. Serner A, Weir A, Tol JL, et al. Return to Sport After Criteria-Based Rehabilitation of Acute Adductor Injuries in Male Athletes: A Prospective Cohort Study. *Orthopaedic Journal of Sports Medicine*. 2020;8(1):232596711989724. doi:10.1177/2325967119897247
14. Short SM, Anloague PA, Strack DS. Rehabilitation and Return to Sport Following Surgical Repair of the Rectus Abdominis and Adductor Longus in a Professional Basketball Player: A Case Report. *J Orthop Sports Phys Ther*. 2016;46(8):697-706. doi:10.2519/jospt.2016.6352
15. Sugimoto D, Mattacola CG, Mullineaux DR, Palmer TG, Hewett TE. Comparison of Isokinetic Hip Abduction and Adduction Peak Torques and Ratio Between Sexes. *Clinical Journal of Sport Medicine*. 2014;24(5):422-428. doi:10.1097/JSM.0000000000000059
16. Thorborg K, Holmich P, Christensen R, Petersen J, Roos EM. The Copenhagen Hip and Groin Outcome Score (HAGOS): development and validation according to the COSMIN checklist. *British Journal of Sports Medicine*. 2011;45(6):478-491. doi:10.1136/bjism.2010.080937
17. Tyler TF, Silvers HJ, Gerhardt MB, Nicholas SJ. Groin Injuries in Sports Medicine. *Sports Health*. 2010;2(3):231-236. doi:10.1177/1941738110366820
18. Weir A, Brukner P, Delahunt E, et al. Doha agreement meeting on terminology and definitions in groin pain in athletes. *Br J Sports Med*. 2015;49(12):768-774. doi:10.1136/bjsports-2015-094869
19. Woodward JS, Parker A, MacDonald RM. NON-SURGICAL TREATMENT OF A PROFESSIONAL HOCKEY PLAYER WITH THE SIGNS AND SYMPTOMS OF SPORTS HERNIA: A CASE REPORT. :16.
20. Yousefzadeh A, Shadmehr A, Olyaei GR, Naseri N, Khazaeipour Z. The Effect of Therapeutic Exercise on Long-Standing Adductor-Related Groin Pain in Athletes: Modified Hölmich Protocol. *Rehabilitation Research and Practice*. 2018;2018:1-10. doi:10.1155/2018/8146819