



Advanced Meniscal Repair Protocol Phase 1

Purpose	Precautions
Maximum Protection	<ul style="list-style-type: none"> • NWB • 0°-90° A/PROM for first 2 weeks • No isolated HS activation for radial/root repairs
Typical Time Frame	
0-6 Weeks	

Criteria to Pass

- 0°-110° of knee AROM
- 30 consecutive SLR without lag

Priority List & Suggested Exercises

1. Knee Extension ROM

- Low Load Long Duration: Extension prop, Prone hangs, Foot on Ottoman (add weight or ice to all)
- Manual Techniques: AP glide of femur on tibia, Patella mobs (superior glides), Passive extension overpressure (add quad set)
- Quad sets with NMES
- Stretches: Hamstring

2. Knee Flexion ROM

- ALL PROM (limit range 0-90°): Seated knee bend off table, Heel slides w/ strap (seated and supine)
- Manual Techniques: Patella mobs (inferior glides)

3. Quad Activation

- Quad sets with NMES (towel roll, 10sec hold)
- SLR with NMES (towel roll > quad set > into SLR > reset)

Special Considerations

- Swelling: compression, elevation, ice, retrograde massage
- NMES: Use with all quad exercises in this phase
- BFR: use as soon as patient able to get a good quad contraction
- Incision: inspect frequently to ensure healing and closing
- Consider aerobic conditioning for HEP throughout all phases to maintain aerobic capacity

Advanced Types:

- Radial
- Root: Partial stable root tear, complete radial tear w/ in 9mm from bony root attachment, bucket handle tear w/ complete root detachment, oblique longitudinal tear w/ complete root detachment, bony avulsion of the root attachment
- Horizontal Cleavage

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Advanced Meniscal Repair Protocol Phase 2

Purpose		Precautions
Protection	<ul style="list-style-type: none">• WBAT to full WB with no AD by 8 weeks• Closed Kinetic chain exercises limited to 40° of knee flexion	
Typical Time Frame		
6-10 Weeks		
Criteria to Pass		
<ul style="list-style-type: none">• Knee ROM is restored to 80% of the uninvolved knee• SLS x 30sec without LOB• Normal gait pattern without AD and with full terminal knee extension		
Priority List & Suggested Exercises		
<ol style="list-style-type: none">1. Knee Extension ROM<ol style="list-style-type: none">a. Continue Phase 1 exercises (add sets and reps per discretion)2. Knee Flexion ROM<ol style="list-style-type: none">a. Continue Phase 1 exercises (adding sets and reps per discretion)b. Nu-step & Bike (½ revolutions progressing to full)3. Quad Activation<ol style="list-style-type: none">a. 4-way SLR (NMES only for forward)b. TKEs with NMES progressionc. Leg press into physioball with NMES (limit to 40° of flexion)d. SAQ with NMES progressione. LAQ with NMES4. Gait Training<ol style="list-style-type: none">a. SLS no UE support > SL balance reachesb. Gait training without crutches (forward and retro) > progress to sled (pulling and pushing)c. Low hurdle (reciprocal pattern) > high hurdle (step to) > high hurdle (reciprocal pattern)d. Calf Raises		
Special Considerations		
<ul style="list-style-type: none">• Swelling: compression, elevation, ice, retrograde massage• NMES: Use for at least 10 minutes until patient can perform unweighted SAQ and LAQ comparable ROM to uninvolved LE• BFR: use as soon as patient able to get a good quad contraction (start at 50% and progress to 80% per patient tolerance and use most of session)• Incision: Should be closed by 6 weeks• Programming: High volume for exercises 2-3 sets of 12-15 reps		

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Advanced Meniscal Repair Protocol Phase 3

Purpose	Precautions
Functional Restoration	<ul style="list-style-type: none"> • Avoid exercises that are painful and cause swelling • Closed Kinetic chain exercises limited to 70° of knee flexion • Still avoid aggressive PROM into knee flexion
Typical Time Frame	
8-16 Weeks	

Criteria to Pass

- Knee ROM is restored to 95% of the uninvolved knee in supine
- Ascend/descend stairs reciprocal pattern without pain or UE assist
- 5 steps ups (10" step)
- 5 lateral step downs (8" step)
- Y balance reach 80% of uninvolved side without hip strategy

Priority List & Suggested Exercises

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| <p>1. Knee Flexion ROM</p> <ul style="list-style-type: none"> a. Continue Phase 2 exercises (adding sets and reps per discretion) b. Manual: Knee flexion with manual tibial internal rotation c. Mobility: Prone quad stretch, Knee Circles d. AAROM: Shuttle press, TRX squat (limit to 70°) <p>2. Anterior Chain Strength</p> <ul style="list-style-type: none"> a. Continue SAQ and/or LAQ with NMES and isometric knee extension at 60° b. Isotonic leg extension (ankle weight > cable resistance) c. Wall sit progression d. Heavy banded TKEs/Shuttle Press TKEs e. SL Shuttle press (limit to 70°) | <p>3. Functional Strength</p> <ul style="list-style-type: none"> a. Squat progression (limit to 70°) b. Step ups progression c. LSD progression <p>4. Posterior Chain Strength</p> <ul style="list-style-type: none"> a. Bridge progression b. Hamstring curls progression c. Quadruped hip extension over bench holds d. Double leg hip thruster holds e. SL RDL reaches f. Calf raise variations <p>5. Lateral Chain Strength</p> <ul style="list-style-type: none"> a. Clamshells > Side lying abduction b. Stork stance holds c. Sidelying shuttle press d. Hip hike holds > hip hike reps |
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Special Considerations

- BFR: Continue use in the earlier part of PT session
- NMES: Use for at least 10 minutes until patient can perform unweighted SAQ and LAQ comparable ROM to uninvolved LE
- Motor Control: If there is still a difference between AROM/PROM focus on motor control (end range strengthening and isometrics)
- Programming:
 - 3:1:1 anterior chain to posterior chain to lateral chain strengthening ratio
 - High volume for exercises 2-3 sets of 12-15 reps
 - Complete 1x25 reps on uninvolved leg for anterior chain exercises and same sets/reps for posterior and lateral chain

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Advanced Meniscal Repair Protocol Phase 4

Purpose		Precautions
Progressive Overload	<ul style="list-style-type: none">• Avoid exercises that are painful and cause swelling• Don't initiate running	
Typical Time Frame		
14-20 Weeks		
Criteria to Pass		
<ul style="list-style-type: none">• Y balance reach 95% of uninvolved side without hip strategy in supine• 30 lateral step downs (8" step, back flat against wall) with no hip compensation• 15 forward step downs (8" step)	<ul style="list-style-type: none">• 25 SL bridges on bench (knee bent at 20°)• 25 SL calf raises (10° incline to 60bpm metronome)• 25 SL squats to box (20") with minimal trunk flexion	
Priority List & Suggested Exercises		
1. Anterior Chain Mobility <ul style="list-style-type: none">a. Dip bar assisted slantboard squat > slantboard squat > dip bar assisted exaggerated split squat on step > no stepb. Couch Stretch, Prone quad stretch	3. Functional Strength <ul style="list-style-type: none">a. LSD progressionb. Forward step down progressionc. SL squat progression	
2. Anterior Chain Strength <ul style="list-style-type: none">a. DL machine extension holds at 0 Degrees > SL holdsb. DL extension > SL extensionc. Sled Pulls/Pushesd. Kickstand Squat at wall > Goblet squate. Eccentric Shuttle press (up with 2, down with 1)	4. Posterior Chain Strength <ul style="list-style-type: none">a. Hip thruster progressionb. RDL progressionc. Hamstring curl progressiond. Calf raise variations	
	5. Lateral Chain Strength <ul style="list-style-type: none">a. Lateral squat progressionb. Stork stance banded repsc. Lateral band walks/skatersd. Side plank progression	
Special Considerations		
<ul style="list-style-type: none">• BFR: Continue to use in the earlier part of PT session• NMES: Use for at least 10 minutes until patient can perform unweighted SAQ and LAQ = ROM to uninvolved LE• Programming:<ul style="list-style-type: none">◦ 3 sets of 6-12 reps with anterior and functional exercises focusing on strength◦ 3:1:1 anterior chain to posterior chain to lateral chain strengthening ratio◦ Tempo: 4-1-2 w/ emphasis on eccentric control◦ Complete 1x25 reps on uninvolved leg for anterior chain exercises and same sets/reps for posterior and lateral chain		

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Advanced Meniscal Repair Protocol Phase 5

Purpose

Intro to Impact

Typical Time Frame

16-22 Weeks

Precautions

- Avoid exercises that are painful and cause swelling
- Don't initiate running until patient has passed the criteria below for return to jogging

Criteria to Pass

To Begin Jogging: (Use Strengthlevel.com)

- 12 reps at 70% of Novice Goblet Squats
- 12 reps at 70% of Novice Forward Lunges
- 12 reps at 70% of Novice DB RDLs
- <30% quad strength deficit for average force with Isometric testing at 60° knee flexion
- 15 SL hops in place w/ good load acceptance & landing in same spot

To Move Onto Phase 6:

- ATHLETES: Run 1mi w/o limping
- GENERAL POP: Jog 5min w/o limping
- Sprint w/o compensation
- Land symmetrical <10% difference w/ 5 squat jumps on Force Plates
- Decel efficiently in the sagittal plane

Priority List & Suggested Exercises

1. Anterior Chain Strength

- Split Squat Isometric Hold
- DL machine extension holds at 0° > SL holds
- DL machine extension > SL machine extension
- Shuttle Press Variations

2. Functional Strength

- Loaded goblet squat progression
- Lunge progression
- Loaded step up variations
- Loaded LSD & Forward step downs

3. Agility/Impact

- Agility ladder (basic coordination)
- Mini hops > Jogging progression > hop & stop > UE assisted treadmill intervals
- Deceleration: snap down progression > cable decels > multiplanar hops > ladder decels > change of pace > stop & goes
- Jump progression

4. Posterior Chain Strength

- Hamstring curl progression
- Hip thruster progression
- Deadlift/RDL variations
- Nordic progression
- Calf raise variations

5. Lateral Chain Strength

- Lateral squat variations
- Copenhagens
- Anti-rotation and balance training

Special Considerations

- Stretching: Continue quad stretching (prone quad and couch stretch)
- Quad Strength: Constant focus to improve quad strength and decrease quad deficit
- Isometric Testing: Quad strength testing at 60°
- Programming:
 - 2:1:1 anterior chain to posterior chain to impact exercises
 - Increase sets to 4 with reps 6-12 specifically for anterior and functional exercises
 - No > 2-3 sets of 3-5 reps for agility/impact exercises
 - Once patient has started to jog begin same sets/reps for all exercises on uninvolved LE



Advanced Meniscal Repair Protocol Phase 6

Purpose	Precautions
Deceleration	<ul style="list-style-type: none"> Don't initiate cutting until patient has passed the criteria below for return to cutting
Typical Time Frame	
5-7 Months	

Criteria to Pass

To Begin Cutting: (Use Strengthlevel.com)

- 8 reps at 80% of Intermediate Goblet Squats
- 8 reps at 80% of Intermediate Forward Lunges
- 8 reps at 80% of Intermediate DB RDLs
- <20% quad strength deficit for average force with isometric testing at 60° knee flexion

To Move Onto Phase 7:

- SL hop test >80% LSI with average of 3 trials
- <20% deficit for Deceleration RFD and Peak Force with landing w/ SL Countermovement Jump on Force Plates

Priority List & Suggested Exercises

1. Agility/Impact

- Medicine ball drops
- Weighted hops > 3-way hurdle hop
- Hop over hurdle in sagittal plane > hurdle hop into lateral plane
- Hop over hurdle (lateral plane) > transition hops
- Lateral shuffles, reactive cutting, pro agility drill, T-test drill
- Cutting footwork drill > cone cutting > reactive cone cutting

2. Anterior Chain Strength

- Heavy SL machine extension
- Advanced Shuttle Press variations
- Leg Extensions on Excentric
- Squat Variations

3. Functional Strength

- Continue with Phase 5 exercises
- Add more load to functional movements
- Excentric: squat, split squat

4. Posterior Chain Strength

- Hamstring curl progression
- Hip thruster progression
- Deadlift/RDL variations
- Nordic progression
- KB swings
- Calf raise variations

5. Lateral Chain Strength

- Lateral step ups
- Lateral squat variations
- Excentric: lateral lunges
- Rotational deadlifts

Special Considerations

- Icing & Stretching: At the end of session or at home; Continue prone quad & couch stretch)
- Programming:
 - No > 3-4 sets of 3-5 reps agility
 - 2:1 Power to Strength ratio
 - Undulated Loading Model: Example: Mon - Mod intensity; Wed - High intensity; Fri - High volume
 - Rest Days: At least 3 days off
 - Tempo: 0-0-0 Decelerate the load and transition to acceleration as fast as possible
 - Plyometrics should be done prior to strengthening in order to avoid fatigue
 - Once patient can tolerate advanced plyometrics for multiple sets/reps without pain and with good form you can begin supersetting strength with power
- Conditioning: Begin through cross training on elliptical, bike, rower, jogging



Advanced Meniscal Repair Protocol Phase 7

Purpose		Precautions
Return to Sport		
Typical Time Frame		
6 Months +		
Criteria to Pass		
<ul style="list-style-type: none">• SL hop test >95% LSI with average of 3 trials• Triple hop test >95% LSI with average of 3 trials• <10% quad strength deficit for average force with isometric testing at 60° knee flexion	<ul style="list-style-type: none">• Girth measurements of the quad within 1 cm of non-surgical limb• Score of 48 or > on the Injury-Psychological Readiness to Return to Sport (I-PRRS) Questionnaire	
Priority List & Suggested Exercises		
<p>1. Agility/Impact</p> <ul style="list-style-type: none">a. Continue with phase 6 agility/impact exercises until performing proficientlyb. Depth jump progression <p>2. Complex Training: Compound Exercise at 80% 1RM (4 reps) followed by a plyometric jump exercise that mimic the same motor pattern (3 reps); 3-6 sets</p> <ul style="list-style-type: none">a. Anterior Chain Complex Example: Front Squats followed by Squat Jumpsb. Posterior Chain Complex Example: Barbell RDLs followed by KB Swingsc. Lateral Chain Complex Example: Lateral Lunges > Skaters	<p>3. Contrast Training</p> <ul style="list-style-type: none">a. Perform a maximal or near maximal lift (90-97% 1RM) followed by a drop set performed at 50-70% 1RM. Perform at maximal velocity. <p>4. French Contrast Training</p> <ul style="list-style-type: none">a. 4 exercises performed in successionb. Heavy compound exercise (80-90% 1RM) 1-4 repsc. Plyometric jump 3 repsd. Drop set or weighted jump (30% 1RM) 3 repse. Accelerated jump (usually band assisted) 2-3 reps	
Special Considerations		
<ul style="list-style-type: none">• Icing: At the end of session or at home• Prioritize Recovery: 2-3 days off/wk• Training Scheme: Master complex training > contrast training > french contrast training• Patients should have about 1 month of sport specific movements before beginning contact. Build confidence with stopping, cutting, training, game like movements/plays, etc.• Contact should be progressed per therapist discretion during practice. Basketball Example: Contact Drills > 3v3 > 2v2 > 1v1 > 5v5• Continue building isolated quad strength and explosive movements• Ramp up conditioning specific to sport		

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