

**Dr Craig Chike Akoh, M.D.
NONOPERATIVE ACL TEAR REHABILITATION PROTOCOL**

	WEIGHT BEARING	BRACE	FOCUS	ROM	EXERCISES	PRECAUTIONS
<i>PHASE I</i> Acute Phase	*WBAT with crutches and progress to FWB and d/c crutches when patient can demonstrate normal gait mechanic	Functional knee brace unlocked	*Control pain and swelling *Restore pain free ROM *Restore normal gait mechanics *Establish good quadriceps activation	*Emphasize knee extension equal to contralateral limb *Goal is to achieve full flexion	-Quad/Add sets, SLR (no lag), hip -Abd/Add/Ext/ER, partial range squats, standing TKE, standing or prone hamstring curl, heel raises	*Minimize joint effusion and edema *Alert physician if patient reports episodes of knee buckling
<i>PHASE II</i> Sub-Acute Phase	FWB	Functional knee brace unlocked	*Maintain ROM and flexibility *Progress strengthening *Improve neuromuscular control	*Maintain full ROM and optimize LE flexibility	Continue Phase 1 strengthening, leg press, leg curl machine, step-ups, squats, plank series, single-limb balance Single-limb balance exercises	*Minimize joint effusion and edema *Alert physician if patient reports episodes of knee buckling *Avoid patella femoral joint stress
<i>PHASE III</i> Limited return to sports	FWB Straight ahead jogging per physician approval	Functional knee brace unlocked	*Maintain ROM and flexibility *Maximize strength, initiate single leg exercises *Maximize neuromuscular control *Initiate plyometrics and light jogging *Initiate return to sport/work activities with physician approval	*Maintain full ROM and optimize LE flexibility	-Bicycle/elliptical/treadmill with progressive resistance -Progress Phase 2 strengthening, step-up progressions, single-limb dead lifts, static lunges -Single-limb balance with perturbations -Double-limb simple and complex plyometrics	*Alert physician if patient reports episodes of knee buckling *Avoid patella femoral joint stress especially with plyometrics *Monitor increased knee effusion with plyometrics *Caution pivoting or lateral movements *Not cleared to return sports
<i>PHASE IV</i> Return to sports	Full	Functional knee brace as needed	* Maintain ROM, flexibility, and strength *Continue dynamic strengthening and proprioceptive exercises	*Continue daily LE stretching I	-Continue daily stretch -Bicycle/elliptical/treadmill with progressive Resistance -Progress Phase 3 strengthening, increase load and decrease repetitions	*Alert physician if patient reports episodes of knee buckling *Avoid patella femoral joint stress especially with plyometrics

			<ul style="list-style-type: none">*Continue plyometrics and initiate agility training*Progress sport specific drills		<ul style="list-style-type: none">-Progress Phase 3 proprioceptive training increasing difficulty of drills-Begin single-limb plyometrics, advance double-limb and single-limb combination jumps-Begin speed and agility program	<ul style="list-style-type: none">*Monitor increased knee effusion with plyometrics*Caution pivoting or lateral movements*Cleared for return to sport per physician
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NONOPERATIVE PCL TEAR REHABILITATION PROTOCOL

	WEIGHT BEARING	BRACE	FOCUS	ROM	EXERCISES	PRECAUTIONS
<i>PHASE I</i> Acute Phase (0-4 wks)	*PWB with crutches 0-2 weeks *WBAT with crutches 2-4 wks *wean from crutches at 4 weeks	Postop brace locked at 0 deg at night	*Control pain and swelling *PCL protection *Restore normal gait mechanics *Establish good quadriceps activation *aim to achieve PROM 0-125 deg without extensor lag and with normal gait	*0-90 deg 0-3 wks Progress to full ROM 3-6 wks	-Quad/Add sets, SLR (no lag) - side-lying hip Abd/Add/Ext/ER, -partial range squats 0-45 deg -gasrocnemius stretch - heel raises/ankle pumps	*Minimize joint effusion and edema *avoid hyperextension for 12 wks *no hamstring stretching or strengthening *no bicycling *Alert physician if patient reports episodes of knee buckling
<i>PHASE II</i> Strengthening (4-8 weeks)	FWB	PCL brace	*Maintain ROM *PCL protection *Progress strengthening *Improve gluteus activation	*Maintain full ROM and optimize LE flexibility	-seated flexion to avoid gravity PCL stress (no prone) -static lunges to 45 deg flexion -step ups -single leg deadlifts with knee extended -gluteal progression -wall sits	*Minimize joint effusion and edema *avoid prone exercise *no open hamstring strengthening or isolated exercises *limit strengthening to 70 deg flexion *Alert physician if patient reports episodes of knee buckling
<i>PHASE III</i> Advanced Strengthening (8-12 weeks)	FWB Straight ahead jogging per physician approval	PCL brace can be discontinued at 12 weeks	*may begin isolated hamstring exercises *progress closed chain exercises >70 deg flexion *initiate running program *Maximize neuromuscular control *Initiate plyometrics and light jogging *Initiate return to sport/work activities with physician approval	*Maintain full ROM and optimize LE flexibility	-Bicycle/elliptical/treadmill with progressive resistance -Progress Phase 2 strengthening, step-up progressions, single-limb dead lifts, static lunges -Single-limb balance with perturbations -Double-limb simple and complex plyometrics	*Alert physician if patient reports episodes of knee buckling *Avoid patella femoral joint stress especially with plyometrics *Monitor increased knee effusion with plyometrics *Caution pivoting or lateral movements *Not cleared to return sports
<i>PHASE IV</i>	Full	PCL brace as needed	* Maintain ROM, flexibility, and strength	*Continue daily LE stretching I	-functional sporting drills -Begin single-limb plyometrics, advance	*Alert physician if patient reports episodes of knee

Return to sports (13+ weeks)			*Continue dynamic strengthening and proprioceptive exercises *Continue plyometrics and initiate agility training *Progress sport specific drills		double-limb and single-limb combination jumps -	buckling *Avoid patella femoral joint stress especially with plyometrics *Monitor increased knee effusion with plyometrics *Cleared for return to sport per physician
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NONOPERATIVE ISOLATED MCL TEAR REHABILITATION PROTOCOL

- This program may be accelerated for Grade I MCL Sprains or may be extended depending on the severity of the injury. The following schedule serves as guidelines to help in the expediency of returning a patient to his or her pre-injury state.
- Please note that if there is any increase in pain or swelling or loss of range of motion these serve as signs that the progression of the patient may be too rapid.

I. MAXIMAL PROTECTION PHASE

Goals: Early protected ROM, Prevent quadriceps atrophy, Decrease effusion/pain

A. Time of Injury: Day One

- Ice, compression, elevation
- Knee hinge brace non-painful ROM; if needed
- Crutches, weight bearing as tolerated
- Passive Range of Motion/Active Assistive Range of Motion to maintain ROM
- Electrical muscle stim to quads (8 hours a day)
- Isometrics Quads: Quad Sets, Straight Leg Raises (Flex)

B. Day Two

- Continue above exercises
- Quadriceps Sets
- Straight Leg Raises (Flexion, Abduction)
- Adduction isometrics
- Hamstring Isometric Sets
- Well Leg Exercises
- Whirlpool for ROM (Cold for first 3-4 days, then warm)
- High Voltage Stimulation to control swelling

C. Day Three - Seven

- Continue above exercises
- Crutches - weight bearing as tolerated
- ROM as tolerated
- Eccentric Quad work
- Bicycle for ROM stimulus
- Resisted Knee Extension with electrical muscle stim
- Initiate Hip Add, Ext
- Initiate Mini-squats

- Initiate Leg Press Isotonics
- Brace worn at night, brace during day as needed

II. MODERATE PROTECTION PHASE

Criteria for Progression:

1. No increase in instability
2. No increase in swelling
3. Minimal tenderness
4. PROM at least 10-100°

Goals: Full painless ROM, Restore strength, Ambulation without crutches

A. Week Two

- Continue strengthening program with PRE's
- Continue electric muscle stim to quads during isotonic strengthening
- Continue ROM exercise
- Emphasize closed kinetic chain exercises; lunges, squats, lateral lunges, wall squats, lateral step-ups
- Bicycle for endurance
- Water exercises, running in water forward and backward
- Full ROM exercises
- Flexibility exercises, hamstrings, quads, IT Band, etc.
- Proprioception training (balance drills)
- Weight shifts
- Tilt board squats
- Stairmaster endurance work

B. Days Eleven – Fourteen

- Continue all exercises in week two
- PRE's emphasis quads, medial hamstrings, hip abduction
- May Initiate Isokinetics, sub-maximal → maximal fast contractile velocities
- Begin running program if full painless extension and flexion are present

III. MINIMAL PROTECTION PHASE

Criteria for Progression:

1. No instability

2. No swelling/tenderness

3. Full painless ROM

Goals: Increase strength and power

A. Week Three

- Continue Strengthening Program
- Wall Squats
- Vertical squats
- Lunges
- Lateral Lunges
- Step ups
- Leg Press
- Knee Extension
- Hip ABD/ADDuction
- Hamstring Curls
- Emphasis:
- Functional Exercise Drills
- Sport cord lunges, cone drills
- Fast Speed Isokinetics
- Eccentric Quads
- Isotonic Hip ADD, Medial Hamstrings
- Isokinetic Test
- Proprioception Training
- Endurance Exercise
- Stationary Bike 30-40 minutes
- Nordic Trac, Swimming, etc.
- Initiate Agility Program, Sport Specific Activities

IV. MAINTENANCE PROGRAM

Criteria for return to competition:

1. Full ROM
2. No effusion
3. No tenderness over MCL
4. No instability
5. Muscle strength 85% of contralateral side

6. Quad strength; Torque/BW
7. Proprioception ability satisfactory
8. Lateral Knee Brace (if necessary)

Maintenance Program

- Continue Isotonic Strengthening Exercises
- Continue Flexibility Exercises
- Continue Proprioceptive Activities

NONOPERATIVE ISOLATED LCL TEAR REHABILITATION PROTOCOL

- This program is for grade I and II LCL tears. Grade III LCL tears should undergo surgical treatment. The following schedule serves as guidelines to help in the expediency of returning a patient to his or her pre-injury state.
- Please note that if there is any increase in pain or swelling or loss of range of motion these serve as signs that the progression of the patient may be too rapid.

I. PHASE I- MAXIMAL PROTECTION PHASE

Goals: Early protected ROM, Prevent quadriceps atrophy, Decrease effusion/pain

A. 0 to 2 weeks

- Ice, compression, elevation
- Knee hinge brace locked at 30 degrees for 6 weeks, except during PT
- Crutches, partial weight-bearing
- Range of motion
 - Begin aggressive patella mobility
 - ROM 30-90 degrees with valgus stress applied during PT
 - Multi-plane straight leg raising

B. 2 to 6 weeks

- Continue above exercises
- Range of motion
 - 0-90 degrees (NO HYPEREXTENSION)

II. PHASE II- PROGRESSIVE STRETCHING AND EARLY STRENGTHENING

A. 6 to 12 weeks

- Continue with modalities to control inflammation
- May begin to progressively increasing weight bearing IN MEDIAL UNLOADER BRACE (to be worn AT ALL TIMES when weight bearing)
- Range of Motion
 - Full knee extension (no hyperextension)
 - Knee flexion to 120°, progress as tolerated
- Exercises
 - Continue with phase I exercise
 - Bilateral closed kinetic chain squatting
 - Multi-plane open and closed kinetic chain hip strengthening
 - Step-up progression
 - Stationary biking

- Pool program; focus on ROM
- Proprioception drills Stairmaster endurance work

III. PHASE III- ADVANCED STRENGTHENING AND PROPRIOCEPTION PHASE

A. Weeks 12 to 16

- Range of Motion
 - Full knee flexion and extension
- Exercises
 - Advance strengthening program progressing to unilateral as tolerated
 - Increase intensity of stationary bike program may add treadmill walking
 - Advance intensity of pool program; focus on strengthening.

B. Weeks 16 to 20:

- Range of Motion
 - Full knee flexion and extension with terminal stretch
- Exercises
 - Advance cardiovascular program; no running
 - Increase intensity of closed kinetic chain exercises
 - Advance proprioception drills
 - Initiate gym strengthening progressing from bilateral to unilateral as tolerated
 - Leg press, squats, partial lunges, hamstring curls, ab/adduction, calf raises
 - Increase intensity of bike and walking program, may add elliptical trainer

C. Weeks 16 to 20:

- May begin a pool running program

IV. PHASE IV- ADVANCE STRENGTHENING AND PLYOMETRIC DRILL PHASE

A. Weeks 20 to 24:

- Implement a full gym strengthening program; including leg extensions at 30° - 0°, progressing to
- full range as PF arthrokinematics normalize
- Begin straight plane running
- Begin controlled lateral functional cord drills:

V. PHASE V – RETURN TO SPORT AND FUNCTIONAL DRILLS PHASE

A. Weeks 24 to 28:

- Continue with aggressive lower extremity strengthening, cardiovascular training, and flexibility
- Implement multidirectional agility drills
- Begin plyometric drills from bilateral to unilateral as tolerated

B. Weeks 28 to 32:

- Follow-up examination with the physician
- Brace fitting for functional knee brace
- Sports test for return to competition