Standard ACL Reconstruction Rehabilitation Protocol

Jacob Mikula MD | Orthopedic Sports Medicine

This protocol provides general guidelines for rehabilitation following standard ACL reconstruction. Progression should be individualized based on the procedure, healing, and patient response, with modifications as directed by the surgeon.

Phase	Goals	Precautions / Restrictions	Treatment

Weeks 0 – 2	● **Protect surgical site**
	● Reduce pain and swelling
	● Active ROM: 0-90 degree
	● Full passive extension
	● Active quadriceps control
	● Reduce muscle atrophy
	● Safe use of crutches with near **normal gait mechanics**
		● **No brace use**
		● WBAT with crutches
		● **No resisted open chain knee extensions for six weeks**
		● **No isolated hamstring strengthening for hamstring autograft surgery**
			General guidelines
			● ROM (as tolerated)
			  ● PROM – AAROM - AROM
			  ● Patella mobilizations
			● Quadriceps recruitment/NMES
			● Global LE/hip strengthening
			● Gait training with crutches
			● Modalities as indicated
			  ● Cryotherapy: 5-7 times per day
			Initial Visit
			● FOTO, LEFS, PSFS
			Weeks 2
			● Follow up with MD

Weeks 2 – 6	● Full, symmetric and pain-free AROM
	● SLR without extensor lag
	● **Normalized gait mechanics**
	● DL squat with good mechanics
	● Progression of quadriceps strength/endurance
	● Increase functional activities
		● Open kinetic chain is limited to bodyweight leg extensions (weeks 2-6)
		● **No resisted open kinetic chain exercises**
		● Initiate isolated hamstring strengthening for hamstring autograft surgery (6 weeks)
		● **No running, jumping, cutting, pivoting, or twisting**
		● **Avoid painful activities/exercises**
			General guidelines
			● AAROM - AROM
			● Gait training progressing from assistive device
			● Core stabilization exercises
			● Closed kinetic chain strengthening as tolerated
			● Global LE strengthening
			  ● Begin functional strengthening exercises (bridge, mini-squat, step up, etc)
			● Double limb to single limb balance/proprioception
			● Aerobic training:
			  ● Walking program when walking with **normal gait mechanics**
			  ● Stationary bike
			● Optional therapies (if available/as indicated):
			  ● BFR therapy
			  ● Anti-gravity treadmill for walking gait
			  ● NMES
			● Modalities as indicated
			Weeks 2–4
			● Optional therapy (if available/as indicated): Aquatic therapy once incision is healed and cleared by surgeon (2-4 weeks)
			Week 6
			● FOTO, LEFS

Phase	Goals	Precautions / Restrictions	Treatment

Weeks 6 – 12	• Full, symmetric and pain-free ROM
	• Progress quadriceps strength/endurance
	• Increase functional activities
		• May initiate resisted open kinetic chain exercise
		  • **90-45°** at 6 weeks
		  • **90-30°** at 8 weeks
		  • **90-0°** at 10 weeks
		  • **90-0°** with progressive loading at 12 weeks
		• **No running, jumping, cutting, pivoting, or twisting**
		• **Avoid painful activities/exercises**
		• **Avoid patellofemoral pain**
			General guidelines
			• End range flexion and extension
			• Aerobic training on stationary bike, elliptical, stair climber, UBE
			• Core stabilization exercises
			• Progressive double and single limb strengthening
			• Single to multi-plane exercise
			• Progression of balance/proprioception
			• Modalities as indicated
			Weeks 6-8
			• Follow up with MD
			Week 12
			• FOTO, LEFS, PSFS, ACL-RSI

Weeks 12-16	• Full, symmetric ROM
	• **No effusion with increased activity**
	• Increase intensity and duration of functional LE strength
	• Initiate return to jogging program
	• Begin low level plyometric and agility training
		• **Avoid painful activities/exercises**
		• Jogging program initiated at 12 weeks if cleared by surgeon
		  • **No effusion**
		  • Full AROM
		  • **>80%** LSI
		• **No jogging on painful or swollen knee**
			General guidelines
			• Increase loading capacity for lower extremity strengthening exercises
			• Continue balance/proprioceptive training
			• Functional assessment (see attached)
			Week 12
			• begin return to jogging program
			  • If applicable, start with pool/anti-gravity treadmill
			• Begin low level plyometric and agility training at 12 weeks
			Months 3-4
			• Follow up with MD

Months 4-6	• Continue to progress functional strengthening
	• Successful progression of the return to running program
	• Initiate higher level plyometric and agility training
		• **No jogging on a painful or swollen knee**
		• **Avoid painful activities/exercises**
		• **Avoid patellofemoral pain**
		• **No participation in sports unless specified by care team**
			General guidelines
			• Progression of return to jogging program
			• Gradually increase lifting loads focusing on form, control, and tissue tolerance
			• Progress as tolerated:
			  • Core Stability
			  • Strength
			  • Endurance
			  • Proprioception/Balance
			• Increase intensity of plyometric and agility training
			• Foot speed and change of direction
			Month 6
			• FOTO, LEFS, PSFS, ACL-RSI
			• Functional assessment at 6 months (see attached)

Months 6 – 9	• Continue to progress functional strengthening	• **No participation in sports unless specified by your care team**	**General guidelines**
			• Progress as tolerated:
			  • Core Stability
			  • Strength

Phase	Goals	Precautions / Restrictions	Treatment
	● Sport-specific training	● **Avoid painful activities**	● Endurance ● Proprioception/Balance ● Begin sport-specific training ● Single-to multi-task ● Reactionary drills ● Perturbation training ● Closed to open environment
Months 9+	● Pass return to play criteria (re-test at 12+ months, if necessary) ● Begin gradual return to sport	● Gradual return to full participation in sports	**General guidelines** ● Progress as tolerated: ● Core Stability ● Strength ● Endurance ● Proprioception/Balance ● Plyometric training ● Agility drills ● Sport-specific activities ● Gradual return to sport progression ● Functional assessment (see attached) **Month 9** ● FOTO, LEFS, PSFS, ACL-RSI **Months 9+** ● Follow up with MD

Anterior Cruciate Ligament Testing Protocol

Week 12

Goals

- Full, symmetric ROM
- Y-balance anterior reach asymmetry < 5 cm
- Quadriceps strength for isometric test > 80% of uninvolved side

Surgery applicability

- ACL reconstruction
- ACL reconstruction with meniscus repair
- ACL Allograft (12 week and 6 month recheck)
- ACL revision (12 week and 6 month recheck)

Testing

- Knee assessment including assessment for effusion
- Passive and active ROM
- Y-balance anterior reach
- Isometric knee extension at 60° and 90°
- FOTO, LEFS, PSFS, ACL-RSI

Month 6

Goals

- Full, symmetric ROM
- Y-balance anterior reach asymmetry < 3 cm
- > 80% LSI for isokinetic testing
- 90% LSI for functional testing
- ACL-RSI > 56

Surgery applicability

- ACL reconstruction
- ACL reconstruction with meniscus repair
- ACL Allograft (9 month)
- ACL revision (9 month)

Testing

- Knee assessment including assessment for effusion
- Passive and active ROM
- Hop Test
  - Single Hop
  - Triple Hop
- Isokinetic Test (90°, 180°/s)
- Y-Balance Anterior Reach
- Agility T-Test
- FOTO, LEFS, PSFS, ACL-RSI

Month 9-10

Goals

- Full, symmetric ROM
- > 90% LSI for isokinetic and functional testing
- Y-balance anterior reach asymmetry < 3 cm
- ACL-RSI > 56

Surgery applicability

- ACL reconstruction
- ACL reconstruction with meniscus repair
- ACL Allograft (12 month)
- ACL revision (12 month)

Testing

- Knee assessment including assessment for effusion
- Passive and active ROM
- Hop Test
  - Single Hop
  - Triple Hop
  - Cross-over Hop
- Isokinetic Test (90°, 180°/s)
- Y-Balance Anterior Reach
- Agility T-Test
- FOTO, LEFS, PSFS, ACL-RSI