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**Appendix S1.** Conventional rehabilitation protocol for ACLR<sup>31-33</sup>

Modalities		When to start	Repetition and loads
Icing		Immediately after surgery	10 min every 2 hours
Ankle pumps			10 rep. X 3 sets X 4-5 times / day
Quad setting			
SLR			During walking
Loading the injured leg			
Faradic			
Patellar mobilization			10 rep. X 3 sets X 4-5 times / day
Heel slides and wall slides			
leg elevation with a pillow under the heel			
Hip (Flex, Ext., Abd. and Add.)		Week 2-22	15 rep. X 3 set AROM then slowly adding resistance (manually or by theraband)
Squat	Half	Week 2-8	
	Full	Week 8-22	
Leg extension	90°- 40°	Week 4-8	15 rep. X 3 set AROM
	90°- 0°	Week 8-13	No weight added
	Full	Week 13-22	15 rep. X 3 set Low resistance (manually or by theraband)
Normalize gait pattern with 2 crutches aiming to without crutches		Week 1	
Cycling and swimming		Week 4-22	15 min
Balancing exercises		Week 8-22	Slowly increasing from static stability to dynamic stability with increasing surface instability and decreasing visual input.

SLR: Straight leg raising, rep: repetition, min: minute, abd: abduction, add: adduction, flex: flexion, and ext: extension.

**Appendix S2.** Accelerated rehabilitation protocol for ACLR<sup>8,31,34</sup>

Phase 1(week 1)			
Modalities	When to start	Repetition and loads	
Icing/cryotherapy	Immediately after surgery	10 min every 2 hours	
Ankle pumps		10 rep. X 3 sets X 4-5 times / day	
Quad setting			
SLR			
Heel and wall slides 0°-90°			
Patellar mobilization in all directions			
leg elevation with a pillow under the heel	Day 1	10-15 min x 3-4 times/ day	
Normalize gait pattern	Day 4	as tolerated	
Aim at walking without crutches	Day 7	If pain is tolerated	
Phase 2 ( Week 2-9)			
Modalities	When to start	Repetition and loads	
Icing/cryotherapy	If necessary		
Maintain full extension	At the start of phase 2.		
Heel and wall slides 0°-120°	week 2	10 rep. X 3 sets X 4-5 times / day	
Heel and wall slides 0°-130°	week 5		
Maintain good patellar mobility	Week 2		
Walking without crutches	Week 2		
Stationary bike	week 3	15 min with	
Walking on Treadmill 4 ways	week 3	20 min (Each way 5 min)	
Stepping on a stair-stepping machine.	week 4	15 min	
Jogging in a straight line	week 8	15 min	
Outdoor cycling	week 8	15 min	
Hip muscles training	Week 2	15 rep. X 3 set (20 RM)	
CKC exercises (Leg press and squat)	0°-60°	Week 2	15 rep. X 3 set (20 RM)  Slowly increasing from static stability to dynamic stability by increasing surface instability
	0°-90°	Week 8	
OKC exercises (Leg extension)	0°-40°	Week 2	No weight was added
	90°-30°	Week 5	
	90°-20°	Week 6	
	90°-10°	Week 7	
	90°-0°	Week 8	
Phase 3 (Week 9-16)			
Modalities	When to start	Repetition and loads	
Stepping on a stair-stepping machine.	Progress of phase 2 to be continued	Duration and resistance increased according to individual's aerobic capacity	
Stationary bike			

CKC exercises (Leg press and squat)	Week 9	12 rep. X 3-5 set (15 RM)	Emphasizing on dynamic stability
	Week 13	10 rep. x 3-5 set (12 RM)	
OKC exercises (Leg extension)	Week 9	20 rep. X 1-2 set (30 rm)	
Normalize running with outdoor jogging	Week 13	15 min	
Hip (abd., add., flex. and ext)	Week 9	12 rep. X 3-5 set (15 RM)	
Lunge 4 ways	Week 9	Each way 15 rep. X 3 set (20 RM) Increasing from static stability to dynamic stability by increasing surface instability and decreasing visual input.	
Balance exercises	Week 9	3 rep x 30 sec each	
Jumping	Week 9	Start with two-legged jumping and work slowly toward one-legged jumping	
Plyometric exercises	Week 13	3 rep x 30 sec each	
<b>Phase 4 (Week 16-22)</b>			
<b>Modalities</b>	<b>When to start</b>	<b>Repetition and loads</b>	
CKC exercises (Leg press and squat)	Week 16	8 rep. X 3-5 set (8RM)	
OKC exercises (Leg extension)	Week 16	20 rep. X 1-2 set (20 RM)	
Lunge 4 ways	Week 16	Emphasizing Maximum power	
Hip (abd. add., flex. and ext)	Week 16	8 rep. X3-5 set (8RM)	
Dynamic Balance exercises	Week 16	3 rep x 30 sec each	
Plyometric exercises	Week 16	3 rep x 30 sec each Emphasizing Maximum power	
Sport-specific tasks training	Week 16	Variations in running, turning and cutting maneuvers are allowed. Duration and speed to be increased and maximized.	

SLR: Straight leg raising, rep: repetition, min: minute, RM: repetition maximum, CKC: closed kinetic chain, OKC: open kinetic chain, abd: abduction, add: adduction, flex: flexion, and ext: extension