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QUESTION

HOW DO YOU MANAGE THE ACL PATIENT FOLLOWING RECONSTRUCTION?

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Early rehabilitation protocols following anterior cruciate ligament (ACL) reconstruction often involved immobilization of the extremity for more than 6 weeks. This was thought to allow time for the graft to heal and the inflammatory phase to pass.¹ Unfortunately, this immobilization had adverse effects on articular cartilage, ligaments, and other structures about the knee. In order to overcome many of the common complications present during the early evolution of ACL reconstruction, Shelbourne and Nitz described an accelerated rehabilitation program with emphasis on early return of full extension and full weight bearing as tolerated.² This accelerated protocol has been controversial, however, due to concerns that it may place increased forces on the ACL graft, leading to increased anterior laxity. This does not appear to be the case, as Beynnon et al demonstrated no significant difference in anterior laxity in a prospective, randomized double-blind study between groups treated with an accelerated or nonaccelerated ACL reconstruction protocol.³ Our ACL rehabilitation protocol is based on the previously mentioned accelerated model because of the decreased likelihood of arthrofibrosis and other complications and improved strength and range of motion. In general, the accelerated ACL rehabilitation protocol described below encompasses many of the lessons learned from earlier, less aggressive protocols.⁴

Our primary rehabilitation goals following ACL reconstruction are progressive weight bearing, restoration of motion with emphasis on full extension, quadriceps strengthening, control of inflammation, and restoration of normal gait. In order to accomplish these goals, we often divide the rehabilitation program into phases,⁵ with each phase getting progressively more complex (Figure 21-1).

Phase 1 is from 0 to 4 weeks postoperative. During this time, patients are weight bearing as tolerated with crutches. They are placed in a range-of-motion brace locked in full extension for ambulation and sleeping for the first week. From weeks 1 to 4, the brace

	WEIGHT BEARING	BRACE	ROM	THERAPEUTIC EXERCISES
PHASE I 0 - 4 weeks	As tolerated with crutches*	0-1 week: locked in full extension for ambulation and sleeping 1-4 weeks: unlocked for ambulation, remove for sleeping**	As tolerated	Heel slides, quad/hamstring sets, patellar mobs, gastroc/soleus stretch***, SLR with brace in full extension until quad strength prevents extension lag
PHASE II 4 - 6 weeks	Gradually discontinue crutch use	Discontinue use when patient has full extension and no extension lag	Maintain full extension and progressive flexion	Progress to weight bearing - gastroc/soleus stretch, begin toe raises, closed chain extension, balance exercises, hamstring curls, and stationary bike
PHASE III 6 weeks - 4 months	Full, without use of crutches and with a normalized gait pattern	None	Gain full and pain-free	Advance closed chain strengthening, progress proprioception activities, begin Stairmaster/Nordic Trac and running straight ahead at 12 weeks
PHASE IV 4 - 6 months	Full	None	Full and pain-free	Progress flexibility/strengthening, progression of function: forward/backward running, cutting, grapevine, etc., initiate plyometric program and sport-specific drills
PHASE V 6 months and beyond	Full	None	Full and pain-free	Gradual return to sports participation, maintenance program for strength and endurance

*Modified with concomitantly performed meniscus repair/transplantation or articular cartilage procedure
**Brace may be removed for sleeping after first post-operative visit (day 7-10)
***This exercise is to be completed in a non-weight bearing position

Figure 21-1. Anterior cruciate ligament reconstruction rehabilitation phases. (ROM = range of motion; SLR = straight leg raises) (Reprinted from Cole B. ACL patellar tendon allograft/autograft reconstruction rehabilitation program. Available at: <http://www.cartilagedoc.org>. Accessed October 1, 2006.)

is unlocked for ambulation and removed for sleeping. Their range of motion is as tolerated. The therapist will specifically work with them on prone leg hangs (Figure 21-2), heel slides, quadriceps and hamstring sets, patellar mobility, gastrocnemius and soleus stretching, and straight leg raises with brace in full extension until quadriceps function returns and there is no longer an extension lag.

Phase 2 is from 4 to 6 weeks. During this time, patients will gradually discontinue the use of crutches. The brace may be discontinued when full extension has been achieved and the patient no longer has an extension lag. The goals for motion are to maintain full extension and progress with flexion as tolerated. The therapist will specifically work with them on progressing to weight-bearing gastrocnemius and soleus stretching, beginning toe raises, closed-chain extension, balance exercises, hamstring curls, and riding a stationary bike.

Phase 3 is from 6 weeks to 4 months. This is the longest phase because it primarily focuses on progressing quadriceps and hamstring strengthening. Patients should have a normal gait without the use of crutches or a brace. Range of motion should be full and pain free. The therapist will specifically work with patients on advanced closed-chain strengthening, progressive proprioception activities, initiating cross-training exercises, and running straight ahead beginning at 12 weeks.

Phase 4 is from 4 to 6 months. Patients progress with flexibility and strengthening and begin progression of function exercises such as running backwards and cutting and pivoting. Plyometric exercise programs and sport-specific drills are initiated.

Phase 5 is from 6 months and beyond. Gradual return to sports participation is allowed and patients continue with a maintenance program for strength and endurance.

Disclaimer

The views expressed in this article are those of the author and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, nor the United States Government.

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