TABLE E-1 Summary of Rehabilitation Protocol Following Repair of Meniscal Tears Extending into the Avascular Region*

	Postoperative Weeks					Postoperative Months			
	1-2	3-4	5-6	7-8	9-12	4	5	6	7-12
Brace: long leg postoperative	X	X	X						
Range-of-motion minimum goals									
0°-90°	X								
0°-120°		X							
0°-135°			X						
Weight-bearing									
Toe touch to 1/4 body weight	X								
1/2 to 3/4 body weight		X							
Full			X						
Patellar mobilization	X	X	X						
Stretching: hamstrings, gastrocnemius-soleus, iliotibial band, quadriceps	X	X	X	X	X	X	X	X	X
Strengthening									
Quadriceps isometrics, straight leg raises, active knee extension	X	X	X	X	X	X	X	X	X
Closed-chain: gait retraining, toe raises, wall sits, mini-squats			X	X	X	X	X	X	
Knee flexion hamstring curls (90°)				X	X	X	X	X	X
Knee extension quadriceps exercises (90°-30°)			X	X	X	X	X	X	X
Hip abduction-adduction			X	X	X	X	X	X	X
Leg presses (70°-10°)					X	X	X	X	X
Balance-proprioceptive training: weight-shifting, mini-trampoline, BAPS, BBS, plyometrics†			X	X	X	X	X	X	X
Conditioning									
Upper-body ergometer		X	X	X					
Stationary bicycle				X	X	X	X	X	X
Aquatic program					X	X	X	X	X
Swimming (kicking)					X	X	X	X	X
Walking					X	X	X	X	X
Stair-climbing machine					X	X	X	X	X
Ski machine								X	X
Running: straight‡								X	X
Cutting: lateral carioca, figure-of-eights‡									X
Full sports activity‡									X

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TABLE E-2 Clinical Outcome of Meniscal Repair*

Citation	No./Type of Meniscal Tears; Anterior Cruciate Ligament Reconstruction	Surgical Details	Evaluation Methods	Failure Rate	Other Results
Billante et al.[51], 2008	38 tears (9 red-red, 28 red-white, 1 white-white); all with anterior cruciate ligament reconstruction	All-inside, RAPIDLOC: mean, 1.97 devices (range, 1-4)	Physical examination: mean, 30.4 months (range, 21-56)	13%	Failures associated only with sex (males)
Krych et al.[53], 2008	47 patients aged ≤18 yr; simple, displaced bucket-handle, complex tears, all isolated	Variety of techniques: arrows, inside-out sutures	Physical examination: mean, 5.8 years; retrospective chart review	38%	Failures associated with complex tears, rim width of ≥3 mm
Bryant et al.[54], 2007	49 tears treated with inside-out suture, 51 treated with arrows; all vertical tears at meniscal synovial junction (red-red or red-white); prospective randomized; anterior cruciate ligament reconstruction (31 in suture group, 34 in arrow group)	Sutures and arrows placed every 5 mm; 10-mm or 13-mm arrows	Physical examination: 2 years	Sutures: 22%; arrows: 21.5%	3 arrows protruded into subcutaneous tissue, one removed. 1 suture required revision; 34 patients could not be randomized because of surgeons' opinion on indications for procedures
Siebold et al.[21], 2007	113 longitudinal 10-25-mm tears (red-red or red-white); 75 with anterior cruciate ligament reconstruction	13-mm or 16-mm arrows; mean, 2 (range, 1-4) per repair	Physical examination: mean, 6 years (minimum, 5 years)	28.4%	81.5% with failure within 3 years postop.
Barber et al.[55], 2006	32 longitudinal posterior horn tears (11 red-red, 21 red-white); 23 with anterior cruciate ligament reconstruction	All-inside, RAPIDLOC: mean, 2.2 devices (range, 1-4)	Physical examination: mean, 31 months (range, 18-48)	12.5%	Chondral grooving observed in 1 knee. Surgeon learning curve to avoid cutting suture during device insertion
Majewski et al.[57], 2006	88 single longitudinal isolated tears	Outside-in; 3-6 sutures	Physical examination: 5-17 years	24%	8% with radiographic grade-2/3 arthrosis on involved side compared with grade 0/1 on uninvolved side
Kotsovolos et al.[58], 2006	61 longitudinal >10-mm tears (22 red-red, 39 red-white); 39 with anterior cruciate ligament reconstruction	All-inside, FAST-FIX: mean, 4.4 anchors	Physical examination: 14-28 months	9.8%	
Barber and Coons[56], 2006	41 longitudinal tears (31 red-red, 10 red-white); 35 with anterior cruciate ligament reconstruction	All-inside, BioStinger: mean, 2.1 devices (range, 1-4)	Physical examination: 24-69 months	5%	Device migration in 4 knees, 3 with repeat surgery. Chondral grooving in 1 knee

Quinby et al.[52], 2006	54 tears (5 red-red, 49 red-white); all with anterior cruciate ligament reconstruction	All-inside, RAPIDLOC: mean, 1.8 devices (range, 1-4)	Physical examination: mean, 34.8 months (range, 24-50)	9%	
Kurzweil et al.[20], 2005	60 vertical longitudinal tears (red-red or red-white); 45 with anterior cruciate ligament reconstruction	Arrows	Physical examination: 36-70 months	28%	20% rate of failure in knees with anterior cruciate ligament reconstruction, normal stability restored. 11% with damage to femoral articular cartilage. 13% of arrows broke during insertion
Haas et al.[66], 2005	42 peripheral longitudinal >10-mm tears (red-red or red-white); 22 with anterior cruciate ligament reconstruction	All-inside, FAST-FIX: mean, 2.8 anchors—vertical, horizontal, or oblique positions used depending on tear	Physical examination: 22-27 months	12%	Failures associated with bucket-handle tears, multiplanar tears, tears longer than 2 cm, tears of >3 months' duration
Barber et al.[59], 2005	89 longitudinal tears (60 red-red, 26 red-white, 3 white-white); mean, 20 mm; 73 with anterior cruciate ligament reconstruction	BioStinger in 47, vertical sutures in 29, BioStinger + sutures in 13	Physical examination: 12-56 months	Vertical sutures: 0%; BioStinger: 8%; BioStinger + sutures: 15%	BioStinger unable to repair larger and anteriorly located tears
Kocabey et al.[60], 2004	55 longitudinal tears (29 red-red, 26 red-white); majority 1-2 cm; 32 with anterior cruciate ligament reconstruction	All-inside, T-Fix: 2-6 devices used, horizontal mattress suture configuration	Physical examination: 4-24 months	13%	Rehabilitation program altered depending on type and size of tear
Steenbrugge et al.[61], 2004	45 tears (15 red-red, 28 red-white, 2 white-white); anterior cruciate ligament torn in 7 in inside-out group, not reconstructed; anterior cruciate ligament torn in 9 in arrow group, 6 reconstructed	Inside-out vertical sutures placed at 3-4 mm intervals in 20; all-inside arrows inserted every 5-10 mm in 25	Physical examination: 6-15 years	Sutures: 0%; arrows: 12%	
Spindler et al.[62], 2003	125 medial meniscus tears; majority in periphery; all with anterior cruciate ligament reconstruction	Inside-out horizontal sutures in 40; all-inside arrows in 85	Physical examination: median, 68 months in suture group, 27 months in arrow group	Sutures: 12.5%; arrows: 11%	
O'Shea and Shelbourne[63], 2003	55 locked bucket-handle tears (1 red-red, 11 red-white, 43 white-white); staged anterior cruciate ligament reconstruction at mean	Inside-out, 3-6 vertical mattress sutures	Follow-up arthroscopy: mean, 77 days postop.; physical examination: mean, 4.3 years postop.	Red-red: 0%; red-white: 9%; white-white: 19%	

	of 77 days after meniscal repair				
Kurosaka et al.[64], 2002	114 chronic vertical or vertical oblique tears in periphery; >1 cm in length; anterior cruciate ligament reconstruction in 102 (92%) of 111 patients	Inside-out, vertical sutures	Follow-up arthroscopy: mean, 13 months (range, 2 to 32); physical examination: mean, 54 months (range, 17-84) after follow-up arthroscopy	32%	Follow-up arthroscopy showed 79% healed. 13 repairs initially healed but failed later postop.
Rodeo[65], 2000	90 tears (78 red-red, 10 red-white, 2 white-white); 38 with anterior cruciate ligament reconstruction	Outside-in, vertical sutures placed every 3-4 mm	Physical examination: mean, 46 months (range, 36-89); magnetic resonance imaging, computed tomography, or arthroscopy in 86	13% (red-white: 40%)	Failure correlated with uncorrected anterior cruciate ligament deficiency, tears in middle-third region, tears in posterior horn of medial meniscus

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