

PREOPERATIVE FACTORS

- ✦ PREOPERATIVE GOALS:
- ✦ MINIMIZE SWELLING
- ✦ NORMAL ROM AND GAIT
- ✦ NEUROMUSCULAR CONTROL AND PROPRIOCEPTION
- ✦ PREVENT MUSCLE ATROPHY
- ✦ TIMING OF SURGERY DEPENDS ON ABOVE AND ASSOCIATED INJURIES

JAAOS 2015 ELLMAN ET AL.

Does Extended Preoperative Rehabilitation Influence Outcomes 2 Years After ACL Reconstruction? A Comparative Effectiveness Study Between the MOON and Delaware-Oslo ACL Cohorts

Matthew J. Palla,¹ PT, MSPT, SCS, David S. Logemann,¹ PT, PhD, SCS, Hage Grottem,¹ PT, PhD, Michael J. Ara,¹ MD, May Arna Risberg,² PT, PhD, Lars Engelenbaek,³ MD, PhD, Laura J. Huston,⁴ MS, Kurt P. Spindler,¹ MD, and Lynn Snyder-Mackler,¹ PT, SCD, SCS, FAPTA

Investigation performed at the University of Delaware, Newark, Delaware, USA

- ✦ COHORT TREATED WITH ADDITIONAL PREOP REHAB (STRENGTHENING, NM EXERCISES) IN ADDITION TO POSTOPERATIVE REHAB PROTOCOL HAD BETTER FUNCTIONAL OUTCOMES (IKDC AND KOOS SCORES) AND RETURN TO PLAY (72% DOC VS 63% MOON) 2 YEARS AFTER ACL RECONSTRUCTION.

The American Journal of Sports Medicine, Vol. 44, No. 10
DOI: 10.1177/1000000016000000

POSTOPERATIVE FACTORS:

- ✦ REHAB PROTOCOL
 - ✦ WHAT CAN WE DO TO PREVENT RETEARS AND BETTER RETURN TO PLAY?
- ✦ PSYCHOLOGICAL FACTORS

JAAOS 2015 ELLMAN ET AL.

Effect of an accelerated ACL rehabilitation protocol on knee proprioception and muscle strength after anterior cruciate ligament reconstruction

Francisco Silva¹, Fernando Ribeiro^{2,3}, José Oliveira¹


¹Santa António General Hospital, Physical Medicine and Rehabilitation Division, Porto, Portugal

²CEPIS, ul. Politechnic Health Institute of the North, Physiotherapy Department, Gandra, Portugal

³CEPIS, Faculty of Sports, University of Porto, Porto, Portugal


Arch Exerc Health 3 (1-2):139-144, 2012

- ✦ SUBJECTS HAD 5 MONTH ACCELERATED ACL REHAB PROTOCOL
- ✦ EVALUATION OF JPS (JOINT POSITION SENSE) AND MUSCLE STRENGTH FOLLOWING ACCELERATED REHAB PROTOCOL FOR ACL RECONSTRUCTION C/W UNINJURED KNEE AND AGE MATCHED NONINJURED CONTROLS
 - ✦ JPS WAS TESTED BY OC ACTIVE KNEE POSITIONING
 - ✦ MUSCULAR STRENGTH WAS TESTED USING BIODEX
- ✦ JPS AND MUSCULAR STRENGTH ARE STILL IMPAIRED AFTER AN ACCELERATED REHAB PROTOCOL WHICH PREDISPOSES THESE POS TO FURTHER MUSCLE OR PROPRIOCEPTIVE RELATED KNEE INJURIES



Biomechanical Measures During Landing Postural Stability Predict Second Anterior Cruciate Ligament Injury After Anterior Cruciate Ligament Reconstruction and Return to Sport

Paterno, ^{1,10*} PT, MS, SCS, ATC; Laura C. Schmitz, ^{1,10*} PT, PhD, Kevin Mitchell, ¹ J. Raun, ⁷ PT, PhD, MPH, FACSM, Gregory D. Myer, ^{1,2*} MS, ScS, ¹⁰ PhD, and Timothy E. Hewett, ^{1,10} PhD, FACSM




ATHLETES PRIOR ACLR >12 MONTHS AND HAD BEEN RELEASED TO FULL ACTIVITY (LEVEL 1 OR 2) BIOMECHANICAL EVALUATION WITH 3D MOTION ANALYSIS

+ TESTING PROTOCOL: DROP VERTICAL JUMP, POSTURAL STABILITY ASSESSMENT AND AP LAXITY


Variable	Odds Ratio	95% Confidence Interval
Experienced hip rotation test moment (angles initial 30% of landing)	6.4	2.1, 20.3
Experienced frontal plane knee moment during landing	5.2	1.2, 2.9
Side-to-side difference in sagittal plane knee moment at initial contact	2.0	1.2, 3.0
Postural stability on landing knee	2.2	1.1, 4.7

ACL INJURY
AJSM 2010



Biomechanical Measures During Landing Postural Stability Predict Second Anterior Cruciate Ligament Injury After Anterior Cruciate Ligament Reconstruction and Return to Sport

Paterno, ^{1,10*} PT, MS, SCS, ATC; Laura C. Schmitz, ^{1,10*} PT, PhD, Kevin Mitchell, ¹ J. Raun, ⁷ PT, PhD, MPH, FACSM, Gregory D. Myer, ^{1,2*} MS, ScS, and Timothy E. Hewett, ^{1,10} PhD, FACSM



PARAMETERS INCLUDED

+ TOTAL FRONTAL PLANE (VA)


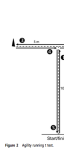
+ GREATER ASYMMETRY IN INTERNAL KNEE EXTENSOR MOMENT AT INITIAL CONTACT
 + DEFICIT IN SINGLE-LEG POSTURAL STABILITY OF THE INVOLVED LIMB
 + HIP ROTATION MOMENT INDEPENDENTLY PREDICTED SECOND ANTERIOR CRUCIATE LIGAMENT INJURY

Likelihood of ACL graft rupture: not meeting six clinical discharge criteria before return to sport is associated with a four times greater risk of rupture

Polykios Kyritsis,¹ Roald Bahr,^{1,2} Philippe Landreau,¹ Rachid Miledi,¹ Erik Wibomwa^{1,3}

Six post return to sport tests	Discharge considered when each of these criteria was met
Isometric test at 60, 120 and 300°/s	Quadriceps deficit <10% at 60°/s
Single leg	Lean asymmetry index <60%
Triple leg	Lean asymmetry index <60%
Triple crossover leg	Lean asymmetry index <60%
On-field sports-specific rehabilitation	Fully completed
Running 1 test	<1.1

+ 158 MALE PROFESSIONAL ATHLETES WHO RETURNED TO SPORT AFTER ACLR
 + 6 TESTS PERFORMED
 + 16.5% REINJURED
 + 2 FACTORS A/W INCREASED RISK
 + NOT MEETING ALL 6 DC CRITERIA
 + DECREASED HS:QUAD RATIO OF INVOLVED LEG AT 60 DEGS
 + FOR EVERY 10% DECREASE IN HS:Q 1.0X HIGHER RISK OF ALL-GRAFT RUPTURE

Simple decision rules can reduce reinjury risk by 84% after ACL reconstruction: the Delaware-Oslo ACL cohort study

Heger Gerdem,¹ Lynn Snyder-Mackler,² Howard Moksness,² Lars Engstbertsen,^{1,3} May Arne Risting,^{1,3}

BR J SPORTS MED 2016

+ PROSPECTIVE
 + RTS TEST B
 + 2 SELF REP
 + 74/83 OF LI
 + 4 PTS RTI
 + 2 YEAR REI
 + THOSE PAR: REINJURY R

What are the findings?

In the first 2 years after ACL reconstruction, 30% of people who returned to level I sports sustained a reinjury compared with 8% of those who participated in lower level sports.
 For every month that return to sport was delayed, until 9 months after ACL reconstruction, the rate of knee reinjury was reduced by 51%.
 More symmetrical quadriceps strength prior to return to sport significantly reduced the knee reinjury rate.

PTS WHO PARTICIPATED IN LEVEL I SPORTS EARLIER THAN 9 MOS SUSTAINED 39.5% RE INJURIES VS 19.4% IN THOSE RETURNING AFTER 9 MOS
 OF THE 55 PTS WHO FAILED RTS CRITERIA 38.2% REINJURED WHEREAS OUT OF THOSE WHO PASSED ONLY 5.6% (1/18) HAD A REINJURY.

- LITERATURE REVIEW OF 136 ARTICLES
- NEUROLOGICAL EFFECTS OF ACL INJURY
 - ALTERS NEUROMUSCULAR CONTROL
 - PROPRIOCEPTION, NOCICEPTOR AND CNS
- MUSCLE EFFECTS OF ACL INJURY
 - QUAD, HS
 - POSSIBLY DUE TO EFFUSION BUT ALSO SEEN BILATERALLY WHICH WOULD INDICATE CNS
 - CORE PROPRIOCEPTION AND NM CONTROL

- FATIGUE
 - SEEN IN BOTH INVOLVED AND UNINVOLVED LE (CROSSOVER EFFECT)
 - NEGATIVE EFFECT ON POSTURAL STABILITY, NEUROMUSCULAR CONTROL AND LE MECHANICS DURING SPORTS WHICH ALL CAN INCREASE RISK ACL INJURY
 - 2/3 OF THOSE INITIALLY PASSED WITH 90% INDEX SCORES COULD NOT PASS THE SAME TESTS WHILE FATIGUED

Ability of a new hop test to determine functional deficits after anterior cruciate ligament reconstruction

- 19 MALE (11 MONTH PO) ACL RECONSTRUCTED PATIENTS PASSED HOP TEST
- PRE-EXHAUSTION PROTOCOL
- REPEAT SINGLE LEG HOP TEST
- 68% SHOWED ABNORMAL RESULTS
- USING A PRE-EXHAUSTION PROTOCOL INCREASED SENSITIVITY OF HOP TEST
- RECREATES SAME ENVIRONMENT AS COMPETITION

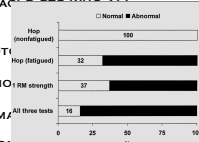


Fig. 2 Results of the tests of functional ability and 1RM knee-extension strength. Values shown are percentages of patients after ACL reconstruction within the normal range (15–20)

CONCLUSION

- ACL INJURIES ARE COMMON INJURIES SEEN IN SPORTS
- ACL RECONSTRUCTION IS CRUCIAL IN ACTIVE PATIENTS/ATHLETES
- PROPER PHYSICAL THERAPY IS VITAL TO RETURN TO PLAY
 - TIME AND **FUNCTIONAL CRITERIA** MUST BE USED FOR APPROPRIATE PROGRESSION
- STANDARDIZED PROTOCOLS SHOULD BE USED FOR RETURN TO PLAY. HOWEVER, OTHER FACTORS MUST BE CONSIDERED... FATIGUE, PROPRIOCEPTION, NONOPERATIVE KNEE ISSUES
- THE PATIENTS/PARENTS SHOULD BE EDUCATED ON THESE TOPICS